Project Specifications
for the
Finley Point State Park
Campground Improvements

Montana Fish, Wildlife, and Parks
FWP #7096123

Finley Point
Lake County, Montana

April 2017

BID SET

NOT FOR CONSTRUCTION

WGM GROUP

FINLEY POINT STATE PARK CAMPGROUND
LAKE COUNTY, MONTANA
FWP # 7096123
SPECIFICATIONS FOR WORK - TECHNICAL PROVISIONS

TABLE OF CONTENTS

SECTION 02700 – SEWAGE AND DRAINAGE

Section 02730	Sanitary Sewer Collection System (MPWSS as amended)
Section 02735	Vault Toilet Site Prep (Added Section)
	Appendix A – Aspen Vault Toilet Specifications

SECTIONS 02900 – LANDSCAPING

Section 02905	Tree Protection (Added Section)
Section 02910	Seeding (MPWSS, as amended)
	Attachment A – Native Seed Mixes
Section 02920	Hydraulic Seeding (MPWSS, as amended)

DIVISION 3 – CONCRETE

Section 3310	Structural Concrete (MPWSS, as amended)

SECTION 01000
DIVISION 1 – GENERAL REQUIREMENTS

This contract will be constructed and administered under the requirements of the Montana Public Works Standard Specifications (MPWSS), Sixth Edition, April 2010, as Amended, and all supplemental documents contained herein. The MPWSS are included in their entirety, as applicable, and as modified, amended, added, or replaced as follows:

01010	Summary of Work (MPWSS, as amended)
01030	Permits (Added Section)
01041	Project Coordination (MPWSS, as amended)
01045	Miscellaneous Work (Added Section)
01047	Mobilization (Added Section)
01050	Field Engineering (MPWSS, as amended)
01150	Measurement and Payment (Added Section)
01300	Submittals (Added Section)
01400	Contractor Quality Control and Owner Quality Assurance (MPWSS, as amended)
01500	Construction and Temporary Facilities (MPWSS, as amended)
01570	Construction Traffic Control (MPWSS, as amended)
01750	Final Cleanup and Closeout (Added Section)

SECTION 01010
SUMMARY OF WORK (MPWSS, as amended)

DELETE SECTION 01010 “SUMMARY OF WORK” IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING

“PART 1: GENERAL

1.1 SUMMARY

A. PROJECT LOCATION: The project is located on South Finley Point Road northeast of Polson, Montana.

B. General work included in this section:

1. Furnish all labor, materials, and equipment required in accordance with provisions of the Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work may not be specifically indicated, furnish and install all miscellaneous items incidental to or necessary to complete finish product as specified.

1.2 CONTRACT DOCUMENTS

A. Contract Documents are defined in Article 1 of the General Conditions, Paragraph 1.1 Basic Definitions, Section 1.1.1 Contract Documents.

1.3 WORK COVERED BY CONTRACT

A. Base bid work to be performed includes, but is not limited to:

Work generally consists of campground improvements, including the demolition of existing campsites and construction of new campsites. Work will include the construction of roads, parking areas, installation of water and sewer lines, vault toilet site preparation, sidewalk and trail construction, maintenance shed, signage, striping, electrical site work, relocation of kiosk, excavation and embankments, seeding, restoration, and incidental construction.

Bid Alternative 1 generally includes the installation of two cabins. This alternative also includes the construction of an asphalt trail, a gravel trail and a natural surface walking trail to access these cabins.

1.4 CONTRACT TIME

A. Contract time shall be 140 calendar days. No additional days shall be allowed with the selection of Bid Alternate 1. Notice to Proceed is anticipated for July 10, 2017. A winter shutdown may be allowed by Owner. If winter shutdown is granted by Owner, final project completion shall be no later than April 15, 2018.

1.5 OWNER FURNISHED ITEMS

A. Owner furnished items, as indicated on the plans, include the following:

- Picnic Tables
- Fire Rings
- Vault Toilets
- Street Sign Faces

1.6 SALVAGED ITEMS

A. The following items shall be salvaged by Contractor and provided to Owner at a location determined by Owner:

- Light Poles
- Pin down curbs
- Large Landscape Rocks
- Picnic Tables
- Fire Rings
- Yard Hydrants
- Cable Gate

1.7 WORK SEQUENCE

A. General: Construct work in stages to allow for uninterrupted public access during construction to the extent possible. Coordinate construction schedule and operations, to include traffic control, with the Owner and Engineer. The Contractor shall plan, schedule, and coordinate his construction operations and activities in a manner that will facilitate the progress of the work included in these Contract Documents, while minimizing disruption and inconvenience of any landowners and general public. The Contractor shall allow public access within the existing improved areas until September 5, 2017. Work in the lower campground area shall not commence until after September 5, 2017 when the campground will be closed to public access. Any power outage required for work shall be minimized and coordinated with the Engineer and Owner. Work in the middle campground shall not commence until the construction of the proposed host sites has been completed. Work within the upper campground improvements can begin upon the issuance of the “Notice to Proceed.”

B. The Contractor shall develop and submit to the Owner and Engineer for approval an initial baseline construction schedule at, or prior to, the pre-construction conference. The schedule must be in conformance with the requirements of section 3.10 within the General Conditions.

C. The Contractor shall be required to attend weekly construction meetings with the Owner and the Engineer as required. Location and dates of these meetings shall be determined at the Preconstruction meeting. These meetings will be conducted to discuss the Contractor’s schedule, progress, and to coordinate construction issues.

D. The Contractor shall coordinate all activities with the Engineer, Owner, landowners, and utility companies associated with the Project, and with any other contractors working within the Project limits. If the Contractor does not achieve any critical dates as listed below, the Owner shall have the authority to stop all other work on the Project until such critical work has been completed. The contractor shall have no claim for additional time or cost associated with such stoppage of work to complete the critical work item.

Listed below is a summary of the general project phasing, and includes an overall summary of the work to be performed and milestones that must be met by the Contractor. Critical schedule constraints are provided in **bold** lettering. Work elements shown are not necessarily on a critical path and may be done simultaneously. Critical work elements shown are not necessarily complete and others may occur as the Work proceeds. The Contractor shall submit a detailed work sequence schedule to accomplish the Work in accordance with the General Conditions and these Special Provisions. The Contractor shall sequence all work to comply with critical dates and sequencing listed below. <u>The Owner will perform any activities that are underlined, if any.</u> All other activities shall be performed by the Contractor as part of the approved work sequence schedule. Refer to the Special Provisions for detailed specifications and conditions associated with each major area of work.

1. Contractor shall submit overall phasing plan, schedule of construction, and initial traffic control procedures as required by the specifications and special provisions for approval.

2. Contractor shall comply with Storm Water Pollution Prevention Plan and install all BMP's necessary prior to the start of construction.

4. The Contractor shall generally be able to work in the sections of the Upper Campground Improvements project area as desired with minimal restrictions with the exception of traffic control restrictions, and the lowering of the existing primary buried electric service.

5. Contractor shall not commence work on the Middle Campground Improvements project area until after September 5th or upon final completion of the two proposed host sites.

6. Contractor shall not commence work on the Lakeside Campground Improvements project area until after September 5th.

E. SEQUENCING: Sequences other than those specified above will be considered by the Owner and Engineer, provided they afford a benefit to public convenience, and follow the general guidelines provide within the special provisions. Owner and Engineer shall have final approval of phasing plan.

F. WORK HOURS: Work outside the regular working hours, including night work, weekends, and federal holidays will not be allowed without prior approval of the Owner, with evidence that it is in the interest of public convenience and timely completion of the project. No additional payment or contract time will be allowed

if a variance is required. Regular work hours shall be 8 A.M. – 6 P.M., Monday – Friday.

1.8 Contractor USE OF PREMISES

A. The Finley Point State Park site shall be open to the public during project construction. . Contractor shall delineate routes with traffic control devices as needed to facilitate access to the state park and the Contractor's project needs. Contractor shall secure and safely store equipment and materials for the project duration."

1.9 DUST CONTROL

A. The CONTRACTOR shall be required to provide dust control throughout the duration of the Project. The Contractor shall use due diligence to water excavated materials, haul roads, etc. to the extent warranted to minimize dust impacts. All costs associated with dust control, including supply of water, shall be incidental to the work.

1.10 SUBSTANTIAL COMPLETION

A. All work associated with this project shall be Substantially Complete with all roadways open to traffic by the date, or within the number of Calendar days set forth in the Agreement. For the purposes of establishing when the project is Substantially Complete and suitable for its intended purpose, all components and work elements described on the plans and within the specification shall be complete with the exception of those items listed within Final Acceptance below.

B. Final Acceptance of total project: Additional work elements that shall be completed for Final Project Acceptance, and are not required for Substantial Completion, include:

1. Any required repairs to the Contractor staging and storage areas.

2. Final punchlist items specifically allowed by the Owner.

3. Final documentation as required within the General Conditions and specifications.

1.11 REGULATORY REQUIREMENTS

A. The CONTRACTOR shall comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to the Work.

B. References in the Contract Documents to local codes shall mean Lake County, Montana

C. Other standards and codes that apply to the Work are designated in the Specifications.

END OF SECTION 01010

SECTION 01030
PERMITS (Added Section)

PART 1: GENERAL

1.1 DESCRIPTION

A. This section specifies the requirements for Contractor to secure and comply with all local, state, and federal regulations required for the project. Contractor shall be responsible for obtaining all permits detailed within the Contract Documents or required by any local, state, or federal regulations, unless specifically stated within the Contract Documents that Owner will provide.

B. Contractor shall comply with Section 3.7 of the General Conditions.

1.2 PERMITS

A. The Contractor shall be required to secure and pay all fees associated with obtaining Authorization for Storm Water Discharge Associated with construction activity under the Montana Pollutant Discharge Elimination System (MPDES). All fees associated with this permit application and any subsequent annual fees or resubmittal fees will be paid for by the Contractor. See section 02270 for additional information.

Contractor should note that the storm water discharge permit does not cover construction dewatering associated with trench excavation. Any permitting required to discharge construction dewatering shall be obtained by the Contractor. The Contractor may contact the Montana Department of Environmental Quality to obtain permit applications and associated fees for construction dewatering.

B. Contactor will be responsible to acquire ALL additional permits necessary and to pay fees and charges for such, unless otherwise specified. Such permits may include, but no limited to; building permit fees, electrical, plumbing, sewer and water connection fees, impact fees, fess associated with construction water as required, and right-of-way permit fees.

1.3 OWNER PERMITS

A. FWP will obtain the septic permits for the latrine installations. FWP will also obtain the approach permit from Lake County to include the haul road access and improvements to the existing approach.

PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. All fees associated with permit acquisition shall be incidental to other work items in the contract and no separate payment shall be made.

END OF SECTION 01030

SECTION 01041
PROJECT COORDINATION (MPWSS, as amended)

DELETE SECTION 01041 "PROJECT COORDINATION" IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

"PART 1: GENERAL

1.1 DESCRIPTION

A. This section specifies the requirements for coordinating, communicating, and sequencing the work under the Contract Documents with public and private parties.

1.2 COORDINATION WITH PUBLIC AND PRIVATE AGENCIES

A. UTILITY COORDINATION: Project work must be coordinated with the utility companies when working near existing facilities. Under no circumstances will a delay in coordination or working around utility facilities be considered as justification for additional compensation or additional extension of time. The Contractor shall be responsible to coordinate all installation of new utilities, and the bracing of existing utilities as shown on the plans or as needed during construction.

The Contractor's attention is directed to the utility facilities shown on the plans. Contractor shall work around and protect existing facilities which exist within the project boundary. Contact the respective utility representative prior to conducting any work in this vicinity.

Contractor shall coordinate all new utility installation as shown on the plans. Contractor shall accommodate the installation of new utilities and shall be responsible for contacting the utility companies and coordinating all phases of the dry utility installation for the project.

1. Mission Valley Power – Electric: Contact Brent Burland, 65 Pablo West Road, Pablo, MT 59855. (406) 675-7900

2. CenturyLink – Telephone: Contact CenturyLink, 216 1St Ave E, Polson, MT 59860 (406) 883-7236

3. Lake County Road and Bridge Department – Traffic Control and Approach Coordination/Utility Permitting: (406) 883-7206.

4. Lake County Environmental Health – Sewer and Water Permitting: Contact Diana Luke, 106 4th Avenue East, Polson, MT 59860 (406) 883-7236.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION

3.1 UNDERGROUND UTILITIES AND STRUCTURES

A. CONTRACTOR shall be required to contact the local one-call agency to verify the location of all underground utilities. Pipelines and other existing underground installations and structures in the vicinity of the work to be done hereunder are indicated on the plans according to information available. The Engineer and the Owner do not guarantee the accuracy of such information. The Contractor shall be required to verify and locate all other pipelines and other existing underground installations and structures in the vicinity of the work prior to beginning excavation.

Except where otherwise specified, any delay or extra cost to the Contactor caused by pipelines or other underground structures or obstructions not shown by the plans, or found in locations different from those indicated, shall not constitute a claim for extra work, additional payment or damages.

B. All utilities, when encountered, shall be supported, shored, and protected wherever exposed in the trench or other excavation. Any existing utility that is damaged during excavation shall be immediately repaired at the contractor's expense. All potholing of existing utilities required to perform the work shall be at the Contractor's expense.

PART 4: MEASUREMENT AND PAYMENT

4.1 PROJECT COORDINATION AND COMMUNICATION

A. Include all costs associated with coordination and project communications in other items of work included in the contract. No separate payment will be made for project coordination or communications."

END OF SECTION 01041

SECTION 01045
MISCELLANEOUS WORK (*Added Section*)

PART 1: GENERAL

1.1 DESCRIPTION

A. The item “Miscellaneous Work” is included in the contract for any minor work and/or material which may be encountered during construction, but which is not addressed elsewhere in the contract.

B. The inclusion of Miscellaneous Work in this contract does not guarantee that additional work will be requested by the Owner or that this item will be used by the Engineer.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION – NOT USED

PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Measurement for Miscellaneous Work will be per the unit listed in the proposal for material and/or work performed as directed by the Engineer. Payment shall be per agreed upon prices or on a force account basis. The number of units in dollars set in the contract is an estimated amount only, which may be adjusted up or down by the Engineer in accordance with the needs of the project. Use of this item is at the sole discretion of the Engineer and is not guaranteed to be used. The inclusion of Miscellaneous Work does not guarantee the contractor payment for the item unless authorized by the Engineer. If this item is not used, there will be no payment made to the Contractor.

END OF SECTION 01045

SECTION 01047
MOBILIZATION AND PREPARATORY WORK (*Added Section*)

PART 1: GENERAL

1.1 DESCRIPTION

A. Mobilization/de-mobilization and preparatory work will include allowance for performance and payment bond costs, insurance costs, move-in and move-out costs, and other preparatory costs.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION – NOT USED

PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Measurement and payment for mobilization/de-mobilization and preparatory work will be made at the lump-sum price listed in the contract for “Mobilization”. Progress payments for mobilization and preparatory work will be made as follows:

1. The total amount of premiums paid by the Contractor to obtain performance and payment bonds and specified insurance will be paid with the first monthly payment.

2. When five percent (5%) of the total original contract amount is earned from contract items other than mobilization/de-mobilization and preparatory work, $10,000 or fifty percent (50%) of the amount bid for mobilization and preparatory work (whichever is less) will be paid.

3. When ten percent (10%) of the total original contract amount is earned from contract items other than mobilization/de-mobilization and preparatory work, $10,000 or the balance of the amount bid for mobilization and preparatory work (whichever is less) will be paid.

4. If the amount bid for mobilization/de-mobilization and preparatory work exceeds the total under Items 2 and 3, the balance will be paid when the total original contract amount earned from proposal items other than mobilization/de-mobilization and preparatory work is thirty percent (30%).

5. Progress payments for mobilization/de-mobilization and preparatory work will be subject to retainage as provided by the General Conditions of the specifications.

END OF SECTION 01047

SECTION 01050
FIELD ENGINEERING (MPWSS, as amended)

PART 1: GENERAL

1.1 ENGINEERING SURVEYS

Delete Paragraphs A – D in their entirety and replace with the following:

"A. All work will be done to the lines, grades, and elevations shown on the plans.

B. The Engineer (Owner's Consultant) will be responsible for initial layout and construction staking, utilizing the Engineer's existing field control and coordinate data. Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between Drawings, Specifications, and existing conditions shall be referred to the Engineer for adjustments before work affected is performed.

C. The Contractor shall keep the Engineer informed, a reasonable time (5 days) in advance of the times and places at which he wishes to do work, so the horizontal and vertical control points may be established and any checking deemed necessary by the Engineer may be done with reasonable notice to the Engineer and minimum delay to the Contractor.

D. The following construction staking will be provided by the Engineer. All other construction staking and layout is the responsibility of the Contractor (such as blue-topping).

1. Control points as shown on the Plans. Temporary benchmarks as needed (5 total).

2. Stake or paint demolition limits as determined adequate by Engineer.

3. Water main - offset line with grade at 50-foot stations for main with two (2) offset stakes for bends, tees, and hydrants. Two (2) offset stakes for end of services.

4. Sewer main - offset line with grade at 25-foot stations with two (2) offset stakes to structure. Two (2) offset stakes for end of service.

5. Edge of sidewalk offset stakes with line and grade will be provided at 25' intervals, as well as any radius points and PC/PT points.

6. Slope staking for general roadway corridors – minimum 50' intervals with reference points.

7. Edge of asphalt stakes at corner and roadway intersection points with grade for campsite areas.

8. The Engineer will work with the Contractor to establish additional field information, to include tent pad locations, signing, striping layout, etc, by marking with paint, flagging, staking or other means.

E. Prior to commencing work, the Contractor shall carefully compare and check all drawings, each with the other that in any way affects the location or elevation of the work to be executed by him, and should any discrepancy be found, he shall immediately report the same to the Engineer for verification and adjustment. Any duplication of work made necessary by failure and neglect on his part to comply with this function shall be done at his sole expense.

F. The Contractor shall be responsible to protect and preserve the established construction staking provided by the Owner until such staking is determined, by both Engineer and Contractor, to no longer be necessary to complete the work. Any restaking required due to Contractor destroying or disturbing construction staking shall be replaced by Engineer at a rate of $150.00/hr for a 2-man survey crew, and billed to the Contractor."

1.2 STREET MONUMENTS AND PROPERTY CORNERS

Add the following to paragraph A.

"If existing property pins and/or other monuments are disturbed during construction activities, the contractor will be responsible for the replacement of such monuments at no additional expense to the Owner."

PART 4: MEASUREMENT AND PAYMENT – NOT USED

Add the following:

"A. Any contractor staking or layout shall not be paid for directly and shall be considered incidental to the work. Contractor shall be responsible to reimburse Owner for any replacement staking at the rates indicated in section 1.1.F."

END OF SECTION 01050

SECTION 01150
MEASUREMENT AND PAYMENT

PART 1: GENERAL

1.1 DESCRIPTION

Measurement and Payment shall be as specified within Section 4 of the individual specification sections for which it is related. The following Measurement and Payment descriptions include those items not specifically called for in the specifications, but are listed on the Proposal. If an item of work indicated on the plans or contained within the specifications does not have a specific item listed in the Proposal, the item shall be considered incidental to the work.

MISC ITEMS

BID ITEM **DESCRIPTION**

1. **SITE ELECTRIFICATION:** This bid item shall include all costs associated with the electrical items as described in the project drawings and specifications listed on the drawings. Direct payments to Mission Valley Power will be paid directly by FWP.

   Measurement: Measurement shall be per the Lump Sum as listed on the Proposal.

   PAYMENT: Payment shall be at the contract unit price bid per Lump Sum for Site Electrification as listed in the Proposal. Payment shall include all labor, equipment, materials, and incidentals to complete the work in accordance with the plans and specifications. All trenching, backfilling, compaction, restoration, including asphalt patching, and other items necessary for construction to be incidental to the item.

2. **CABINS:** This bid item shall include all costs associated with providing structures meeting the requirements as described in the project drawings and specifications, concrete pier foundations, and setting and securing of the structures to the foundations and shall include those materials and installations necessary to project requirements and national, state, and local building codes.

   Cabins shall be built to the dimensions and details as shown on the plans. Cabins shall be equipped with all the features, excluding the loft option, provided by the Dearborn model cabin by Montana Shed Center or approved equal.

   Montana Shed Center can be contacted at;
   Mike Campbell
   1516 N Montana Ave
   Helena, MT 59601
   (406) 437-3187

   Contractor to submit final proposed building plans complete with floor plan, elevations, framing details, and isometric view, including electrical plan prior to ordering.

Measurement: Measurement shall be per Each as listed on the Proposal.

Payment: Payment shall be at the contract unit price bid per each for Cabin as listed in the Proposal. Payment shall include securing approved cabins, foundation installation, setting and securing of the structure, final restoration, and all labor, materials, and incidental required to complete the item in place.

3. **MAINTENANCE SHED:** This bid item shall include all costs associated with providing a structure meeting the requirements as described in the project drawings and specifications, foundation, and setting and securing of the structures to the foundation and shall include those materials and installations necessary to project requirements and national, state, and local building codes. The Maintenance Shed shall be built to the dimensions and details as shown on the plans

   Contractor to submit final proposed building plans complete with floor plan, elevations, framing details, and isometric view, including electrical plan prior to ordering. Contractor to coordinate with owner for colors prior to ordering. Contractor to comply with all national, state, and local building codes and secure all permits necessary for construction.

   Measurement: Measurement shall be per the Each as listed on the Proposal.

   Payment: Payment shall include securing the approved shed, foundation installation, setting and securing of the structure, final restoration, and all labor, materials, and incidental required to complete the item in place.

4. **TENT PAD:** This bid item shall include all costs associated with constructing a tent pad including the lumber, base course, pea gravel and labor to install.

   Measurement: Measurement shall be per the Each as listed on the Proposal.

   Payment: Payment shall be at the contract unit price bid per Each for Tent Pad as listed in the Proposal. Payment shall include all labor, equipment, materials, and incidentals to complete the work in accordance with the plans and specifications.

5. **RELOCATE KIOSK:** This bid item shall include removal and relocation of the existing information kiosk as shown in the plans. This item includes the removal of the kiosk and “Self-Pay” pole from their current location, construction of a concrete pad, and re-installation of the kiosk and “Self-Pay” pole to the new location shown in the plans.

   Measurement: Measurement shall be per the Lump Sum as listed on the Proposal.

   Payment: Payment shall be at the contract unit price bid per Lump Sum as listed in the Proposal. Payment shall include all labor, equipment, materials, and incidentals to complete the work in accordance with the plans and specifications.

6. **SIGN BOLLARD:** This bid item shall include all costs associated with the installation of a sign bollard as described in the project drawings and specifications

Measurement: Measurement shall be per the Each as listed on the Proposal.

Payment: Payment shall be at the contract unit price bid per Lump Sum for Site Electrification as listed in the Proposal. Payment shall include all labor, equipment, materials, and incidentals to complete the work in accordance with the plans and specifications.

7. **NATURAL SURACE WALKING TRAIL:** This bid item shall include all costs associated with constructing a natural surface trail as described in the project drawings.

   Measurement: Measurement shall be per the Linear Foot listed on the Proposal.

   Payment: Payment shall be at the contract unit price bid per Linear Foot for Natural Surface Walking Trail as listed in the Proposal. Payment shall include all materials, labor, equipment, and incidentals required to construct the trail. Any clearing and grubbing or tree removal necessary to complete the items is considered incidental.

8. **RELOCATE GATE POST AND TIE BACK POSTS:** This bid item shall include the relocation of the existing gate and tie-back posts near the entrance to the Finley Point State Park. This item includes the removal and replacement in the new location as described in the project drawings.

   Measurement: Measurement shall be per Lump Sum listed on the Proposal.

   Payment: Payment shall be at the contract unit price bid per Lump Sum for Relocate Gate Posts and Tie-Back Posts as listed in the Proposal. Payment shall include all materials, labor, equipment, and incidentals required to remove and reset the poles, and gate.

END OF SECTION 01150

SECTION 01300
SUBMITTALS (Added Section)

PART 1: GENERAL

1.1 SUBMITTAL REQUIREMENTS

A. The Contractor shall comply with the submittal requirements as indicated within section 3.12 and section 4.2.7 of the General Conditions. The following is a list of minimum submittal items required for the project.

1. Work schedule/Traffic Control Plans
2. Aggregate Materials, Including Moisture Density Curves
3. Asphalt Mix Design (current within 12 months)
4. Concrete Mix Design (current within 12 months)
5. Pavement Markings
6. All Electrical Components
7. All Water related items (main, services, fittings, hydrants, etc.)
8. All Sewer related items (main, services, fittings, etc.)
9. Cabins and related appurtenances
10. Maintenance Shed and related appurtenances
11. Sign Posts and Hardware
12. Seed Mix/Hydroseeding

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION – NOT USED

PART 4: MEASUREMENT AND PAYMENT

ADD THE FOLLOWING:

"4.1 All costs associated with the preparation and submittal of ALL submittals, including but not limited to; shop drawings, samples, schedules, and record drawings, shall not be paid for directly and shall be considered incidental to the work."

END OF SECTION 01300

SECTION 01400
CONTRACTOR QUALITY CONTROL AND CONTRACTOR QUALITY ASSURANCE
(MPWSS, as amended)

Delete SECTION 01400 “CONTRACTOR QUALITY CONTOL AND OWNER QUALITY ASSURANCE” in its entirety and replace with the following:

“SECTION 01400
CONTRACTOR QUALITY CONTROL AND CONTRACTOR QUALITY ASSURANCE
(MPWSS, as amended)

PART 1: GENERAL

1.1 DESCRIPTION

A. This section describes the Contractor Quality Control and Quality Assurance testing requirements in conformance with Article 3.1.6 of the General Conditions.

B. All work shall be tested and inspected to insure compliance with the contract documents. Complete payment will not be made until the Contractor has demonstrated that the work is compete and has been performed as required. If the Engineer detects a discrepancy between the work and the requirements of the Contract Documents at any time, up to and including final inspection, such work will not be paid completely until the Contractor has corrected the deficiency.

1.2 REFERENCES

A. The following ASTM publication is a part of this specification.

ASTM E 329 – Evaluation of Testing and Inspection Agencies as Used in Construction.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION

3.1 GENERAL

A. The Contractor shall employ and pay for the services of an independent testing laboratory to perform specified laboratory testing of materials and equipment prior to the start of construction. The Contractor shall perform:

1. Initial moisture/density proctor curves for all bedding, gravel bases, and borrow material. The maximum density curve and gradation shall be current (within the last 12 months). Contractor shall also provide a sieve analysis for base course, bedding, and surfacing materials.

2. Contractor shall supply mix designs for all concrete and asphaltic concrete surfacing. All mix designs shall be current (within the last 12 months).

B. The Contractor will employ and pay for the services of an independent testing laboratory to perform soils, asphalt, and concrete testing for determining compliance with the specifications during the course of construction. The Contractor shall schedule all such field testing. During the course of construction, the following minimum testing requirements will be required:

1. The Contractor shall provide in place field density tests. In place density tests for any backfill, embankment, trench excavation, subgrade, sub base and base course material shall, as a minimum, be required for the first lift of backfill for trenching operations to set a pattern of compaction, and at intervals of every 200'. In place density tests for surfaced areas shall, as a minimum, be required at intervals of two hundred (200') feet for subgrade and base courses. The Engineer has the right to require additional testing if, in the opinion of the Engineer, test data is not sufficient to compare conformance to the specifications for the overall Project.

   A minimum of the top six (6") inches of subgrade within the expansion areas, which are to be paved, shall be mechanically compacted until the material no longer responds to compactive efforts. All embankments shall be compacted for the full depth with 6" maximum lifts. The Engineer has the right to require the Contractor to perform density testing on subgrade materials if, in the opinion of the Engineer, the methods for compaction do not seem sufficient for the material being used.

2. Field samples shall be taken of the base, bedding, and cushion materials, and a sieve analysis run to compare to the approved gradation. A minimum of 2 field sieve analysis shall be performed for the base material, and 1 for the bedding material.

3. Contractor will be required to provide a minimum of 1 core sample of bituminous pavement for every 400 feet of roadway, and every 10,000 square feet of parking lot. The Engineer will determine core sample locations. Contractor shall provide certified laboratory results from the samples taken as to thickness and actual density.

4. The Contractor shall furnish certified results of a Marshall Test showing the bulk specific gravity determination, stability and flow data, and density and void analysis. Contractor shall complete a field marshal test during each day of paving, or a minimum of two field Marshalls for the Project. Field density testing shall be in conformance with Section 02510, paragraphs 3.9 and 3.28.

   The Contractor will provide the Engineer with copies of all testing results performed on the Project. All testing results shall be submitted and reviewed by the Engineer prior to the installation of subsequent material installation (i.e. base material tested and approved prior to paving).

5. Contractor shall provide a minimum of one set of concrete tests for every 50 cubic yards of concrete placed on the project. The first concrete pour

shall be tested. Concrete tests shall, at a minimum, include results for air, slump, and compressive strength.

Delete Part 4: MEASUREMENT AND PAYMENT in its entirety and replace with the following:

"PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Contractor quality control and assurance testing shall be paid at the lump sum price submitted for "Contractor Testing". Payment shall include all labor, equipment, materials, and incidentals to complete the testing requirements herein.

B. Minimal testing will be required if the bid alternative is selected. This testing will not be paid for separate, and shall be considered incidental to the testing in paragraph A."

END OF SECTION 01400

SECTION 01500
CONSTRUCTION AND TEMPORARY FACILITIES (MPWSS, as amended)

PART 1: GENERAL

1.1 CONSTRUCTION FACILITIES

Add the following to paragraphs:

"D. POWER - Contractor shall arrange for and provide all required power. All power for lighting, operation of the Contractor's plant or equipment, or any other use by the Contractor, shall be provided by the Contractor at their sole cost and expense. Power supply to facilities that will become a permanent part of the Project are the Contractor's responsibility until such time the Project has achieved Final Acceptance, at which time the Owner will become responsible for payment of such facility.

E. SANITARY FACILTIES/WATER – Contractor shall not use the existing facilities on the project site. This includes any potable water for sanitary facilities. Contractor shall provide all drinking water for personnel. Contractor shall be responsible to provide all water for executing the work, including any water necessary for testing operations. Contractor shall provide all sanitary facilities as required by laws and regulation. Not less than one sanitary facility for every ten personnel, to include contractor and subcontractor, shall be provided. Service, clean, and maintain all facilities and enclosures. Provide wash facilities for all personnel.

F. GARBAGE – Contractor shall not use Owner's receptacles or facilities for garbage collection. Contractor shall be responsible to use their own facilities for all garbage collection and disposal. Contractor shall provide bear-proof enclosures, and regularly dispose of waste off site."

1.5 HAUL ROUTES

Add the following to paragraph A:

"See Section 01570 Traffic Control for additional requirements of haul routes."

PART 4: MEASUREMENT AND PAYMENT

Delete 4.1 in its entirety and replace with the following:

"4.1 PAYMENT

A. Unless specifically noted otherwise, all construction and temporary facilities included in the work shall be incidental to other work items in the contract and no separate payment shall be made."

END OF SECTION 01500

SECTION 01570
CONSTRUCTION TRAFFIC CONTROL (MPWSS, as amended)

DELETE SECTION 01570 "CONSTRUCTION TRAFFIC CONTROL" IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

PART 1: GENERAL

1.1 SUMMARY

A. The Contractor shall schedule his construction operations in a manner which will assure that the safety and convenience of motorists, pedestrians, and residents and the safety of construction workers and the general public are adequately met at all times.

B. Contractor shall be responsible for the development and submittal for final approval of all traffic control procedures associated with the project. Contractor shall work closely with the Engineer, Owner, and Lake County, in the development of the project phasing and associated traffic control measures, and shall follow all local and county standards in relation to any detours or road closures necessary to complete the work.

C. For questions related to traffic control procedures within Lake County right-of-way, contact the Lake County Road and Bridge Department – (406) 883-7206.

1.2 PROJECT OVERVIEW

A. All attempts shall be made to allow the existing traffic to operate on two lanes of the main campground roadway. One-way flagging may be necessary at specific points in construction.

B. Contractor has the option to construct a haul road at the location shown on the plans to avoid damaging existing asphalt surfacing, and to minimize traffic control impacts. See paragraph 3.16 of Section 02230 for additional details for haul road requirements.

PART 2: PRODUCTS

2.1 GENERAL

A. The Contractor is solely responsible for the construction traffic control devices, and the material, use, and types of all traffic control devices. All products used for traffic control shall meet the most recent requirements of OSHA and the MUTCD (Manual of Uniform Traffic Control Devices for Streets and Highways) and/or Local Standards.

PART 3: EXECUTION

3.1 SUMMARY

A. Construction phasing and traffic control will be critical components to the success

of the Project. Contractor shall allow adequate time for review of each phase of traffic control. Contractor shall allow one-week (1-week) review time for traffic control phasing allowing single and double lane traffic. Contractor shall follow Lake County traffic control standard/procedures when effecting county right-of-way.

B. The CONTRACTOR shall submit a detailed traffic control plan for each section of the project to the Engineer for distribution and review, as required. Prior to starting work or altering an approved segment of the traffic control plan, the Contractor shall submit to the described authorities, their plan for barricading, signing, detouring and securing the project area and its related traffic. The Owner and Lake County shall have final authority for the review and approval of traffic control and may direct the Contractor to provide additional items at no additional compensation if, in their estimation, the proposed plan does not adequately address the safety and convenience of the public and/or does not conform to the required standards. No work shall commence or advance until the related traffic control plan is approved. Therefore, the initial plan must be submitted prior to issuance of the Notice to Proceed. The Contractor shall then install all required traffic control facilities prior to commencing work and maintain such throughout the project. The Contractor shall notify any affected property owners a minimum of seventy-two (72) hours in advance of private driveway closures, and proof of such notices shall be provided to the Engineer before such closures can commence. Private driveways that are closed due to construction should be reopened as soon as possible.

C. Minimize impacts, to the greatest extent possible, by shortening the time that roadway and pedestrian routes are out of service. Remove, replace, and re-open for public access all trails or sidewalk segments as soon as possible.

3.2 TRAFFIC CONTROL SIGNING COMPLIANCE

A. The CONTRACTOR is solely responsible for the construction traffic control devices, and the material, use, and types of all traffic control devices shall meet the requirements of OSHA and the Manual of Uniform Traffic Control Devices (MUTCD).

3.3 NOTIFICATION OF CONSTRUCTION

A. The CONTRACTOR shall be responsible for notifying all State, County, City, local or private services, departments, agencies, or organizations whose normal or emergency services may be affected by the construction activity. Notification shall be made at least seventy-two (72) hours in advance of the proposed construction activity, and proof of such notices shall be provided to the Engineer before construction activities can commence. Immediately after the applicable construction activity has been completed, the notified department, agencies, or organizations shall be contacted and informed that the affected highway, road, street, alley, or access is open for normal traffic flow.

3.4 TRAFFIC CONTROL PROCEDURES

A. When construction operations are conducted along streets and roadways, the

Contractor shall have proper signs and barricades in place at each side of the work site. All public thoroughfares that are closed to traffic shall be protected by means of effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section. All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sunset to sunrise. Materials stored upon or alongside public streets and highways shall be so placed, and the work at all times shall be so conducted, as to cause the minimum obstruction and inconvenience to the traveling public. All barricades, signs, lights and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and the authority having jurisdiction thereover. When it is necessary for the Contractor to leave a section of trench open, materials stockpiled or equipment parked alongside the street at the end of a work day, or prior to weekends or holidays, the Contractor shall, with the approval of the Engineer, install adequate barricades, vertical panels, or delineators at the work site. All private access shall be open at the end of each workday and on weekends and holidays unless otherwise approved. When trenching operations disturb the edge of the paved street so as to create a traffic hazard, vertical panels or delineators shall be placed, as approved by the Engineer, until the street is repaired. All signs and barricades shall be attached to portable mounts.

B. The Contractor shall have an emergency contact(s) available during all working and non-working hours, to include weekends and holidays, for notification of replacement, re-erection, or corrections to traffic control devices.

3.5 ACCESS FOR EMERGENCY SERVICES

A. Full time access to and from fire station(s) and other locations where emergency vehicles are housed will be provided. It shall be the Contractor's responsibility to coordinate with local emergency providers to determine emergency vehicle locations.

Delete Part 4: MEASUREMENT AND PAYMENT in its entirety and replace with the following:

"PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Unless specifically noted otherwise, all traffic control associated with the work shall be incidental to other work items in the contract and no separate payment shall be made."

END OF SECTION 01570

SECTION 01750
FINAL CLEANUP AND CLOSEOUT ITEMS (Added Section)

PART 1: GENERAL

1.1 DESCRIPTION

A. This work consists of final cleanup of the project site prior to final acceptance and final closeout requirements.

PART 2: PRODUCTS – NOT USED

PART 3: EXECUTION

3.1 SITE CLEANUP

A. The contractor shall be responsible for final clean up at the end of the project to a level satisfactory to the owner. All construction debris, no mater how small, shall be collected and removed from the site. All wheel ruts shall be filled in and be leveled to match the adjacent grade and material. Re-seeding or other re-surfacing may be necessary to repair any construction related impacts or damage.

B. All survey markings, stakes, temporary paint marks, flagging and other devices shall be removed regardless of who installed them. All excess pavement, concrete, gravel, soil, or other construction materials not intended for permanent use shall be removed.

C. All final slopes shall be dressed manually to remove woody debris, accumulated trash and oversized material. Any new slope or topsoil surfaces shall be hand raked to provide a uniform appearance. The contractor shall dress all gravel, pavement and concrete edges to eliminate abrupt edges and provide a smooth transition. All construction related temporary sediment control devices shall be removed as soon as practical.

D. Clean all permanent traffic control devices and signs

E. Sweep all roadway and concrete surfaces free of debris.

F. Ensure all gravel is smooth and uniform and flush with adjacent surfacing unless otherwise indicated on the plans.

3.2 CLOSEOUT INFORMATION

A. Submit all record drawing information as required in section 3.11 of the General Conditions.

B. Submit all operation and maintenance manuals (O&M Manuals) where applicable. Operation and maintenance data shall be submitted with 2 identical sets, and bound within three ring binders. Include all written warranties with the O & M manuals.

PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Unless specifically noted otherwise, all final cleanup work shall be incidental to other work items in the contract and no separate payment shall be made.

END OF SECTION 01750

SECTION 02000
DIVISION 2 – SITEWORK

This contract will be constructed and administered under the requirements of the Montana Public Works Standard Specifications (MPWSS), Sixth Edition, April 2010, as Amended, and all supplemental documents contained herein. The MPWSS are included in their entirety, as applicable, and as modified, amended, added, or replaced as follows:

02112	Removal of Pavement, Concrete, Curb, Sidewalks, Driveway, and/or Structures (MPWSS, as amended)
02221	Trench Excavation & Backfill for Pipelines & Appurtenant Structures (MPWSS, as amended)
02230	Street Excavation, Backfill, and Compaction – Including Soil Profiles from Project Test Pits (MPWSS, as amended) Attachment A – Geotechnical Report (January 13, 2017)
02235	Crushed Base Course (MPWSS, as amended)
02250	Watering (MPWSS, as amended)
02270	Soil Erosion and Sediment Control (Added Section)
02502	Asphalt Prime and/or Tack Coat (MPWSS, as amended)
02510	Asphalt Concrete Pavement (MPWSS, as amended)
02529	Concrete Sidewalk, Driveways, Approaches, Curb Turn Fillets, Valley Gutters, and Miscellaneous New Concrete Construction (MPWSS as amended)
02581	Pavement Markings and Markers (Pre-Formed Plastic, Paints, and Enamels) (MPWSS, as amended)
02585	Street Signs (MPWSS, as amended)
02660	Water Distribution System (MPWSS, as amended) Attachment A – ASTM F 2164 – Standard Practice for Field Leak testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping systems Using Hydrostatic Pressure
02730	Sanitary Sewer Collection System (MPWSS as amended)
02735	Vault Toilet Site Prep (Added Section) Appendix A – Aspen Vault Toilet Specifications
02905	Tree Protection (Added Section)
02910	Seeding (MPWSS, as amended) Attachment A – Native Seed Mixes
02920	Hydraulic Seeding (MPWSS, as amended)

SECTION 02112
REMOVAL OF PAVEMENT, CONCRETE, CURB, SIDEWALKS, DRIVEWAY, AND/OR STRUCTURES (*MPWSS, as amended*)

PART 3: EXECUTION

Add the following:

"3.2 CUTTING OF PORTLAND CEMENT CONCRETE OR ASPHALT

A. Concrete areaways, curbs, driveways, pavements, sidewalks, and slabs will be cut in a manner and the extent specified herein or as directed by the Engineer. The outer edge of all cuts through concrete items will be sawn through to a depth of not less than thirty (30) percent of the total thickness by means of a power driven concrete saw. All cuts will be in a straight line perpendicular or parallel to the centerline of the excavation unless approved by the Engineer. Concrete and asphalt items encountered when excavating will be removed to a minimum width of 12 inches greater than the width of the trench. Where the cut line is less than 4 feet from the edge of the existing pavement, remove and replace the entire pavement section between the trench and edge of pavement unless otherwise approved by the Engineer.

B. Asphaltic surface cutting will be done with a power driven saw to the same requirements cited above. An excavator may use a backhoe bucket in removal of asphaltic surface; square cutting of asphaltic surface to follow backfill operation, with area to be square cut marked by the Engineer.

C. Asphalt cutting and removal shall be in a straight line that will provide for a uniform pavement patch.

D. Whenever an excavator is required to remove curb or sidewalk to perform the work, they will be allowed to, and required to reinstall such curbs and sidewalks to match existing:

1. The concrete curb and sidewalk replacement work will conform to the details on the plans and concrete forms will be inspected by the Engineer prior to placement of the concrete.

PART 4: MEASUREMENT AND PAYMENT

Delete Paragraphs 4.1 through 4.4 in their entirety and add the following:

"4.1 GENERAL

A. No separate measurement will be made for items associated with the removals as described within this specification and as shown on the plans, as well as any additional items/structures to be removed or temporarily relocated such as boulders, concrete and structure removals, removal and/or transplanting of landscaping items, and those items associated with Clearing and Grubbing and

any additional appurtenant work as required to complete the project. All costs for this item, including but not limited to, saw-cutting and removals, all excavation, trenching, backfill and compaction as required, suitable borrow material for compaction, loading, hauling, and removal from site, any dumping fees, labor, equipment, material, and incidentals required to complete removals as called for on the plans or as may be incidental to the work are to be included in the lump sum unit price for Clearing, Grubbing, and Demolition."

END OF SECTION 02112

SECTION 02221
TRENCH EXCAVATION & BACKFILL FOR PIPELINES & APPURTENANT STRUCTURES
(*MPWSS, as amended*)

PART 1: GENERAL

1.3 STANDARD DRAWINGS

Delete paragraph A. and add the following:

"A. "Pipe embedment for all utility trenching (sewer, water, electrical and related work) shall be per the details on the Drawings."

PART 2: PRODUCTS

Delete section 2.1 "Pipe Bedding Material" in its entirety and replace with the following:

"2.1 PIPE BEDDING MATERIALS

A. Unless otherwise shown on the drawings, pipe-bedding material will be placed in a thickness equal to 1/4 x pipe O.D. below the pipe (4-inch minimum) to 6 inches above the pipe. Bedding material will be clean, non-cohesive, natural, unwashed gravel, sand, or crushed hard stone graded as follows with a plasticity index of six (6) or less as determined by AASHTO testing methods T89 and T90.

NORMAL TYPE 1 BEDDING		**WET CONDITION TYPE 1 BEDDING**	
Sieve Size	**Percent Passing**	**Sieve Size**	**Percent Passing**
1 inch	100	1 inch	100
#4	40 - 70	#4	40 – 100
#200	Less than 10	#200	0

Where groundwater is encountered, Wet Condition Type I bedding shall be used. Native trench material will not be used for pipe bedding material. In rock areas the minimum bedding below the pipe will be 6 inches. No stones or hard rock larger than 6 inches will be placed within 2 feet above the pipe unless the bedding above the pipe is increased to 12 inches.

B. Bedding material will be compacted to 98% of maximum dry density as determined by AASHTO T-99.

C. Special pipe embedment may be required when shown on the drawings.

D. Placement and Compaction. All granular fill material beneath the pipe will be spread and compacted to provide a uniform and continuous support beneath the pipe at all points between bell holes or pipe joints. It will be permissible to slightly disturb the finished subgrade surface by the withdrawal of pipe slings or other

lifting tackle. No part of any bell or coupling will be in contact with the trench bottom, trench walls, or granular fill when the pipe is jointed.

E. After each pipe has been graded, aligned, and placed in final position on the bedding materials, and shoved home, sufficient pipe embedment material will be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing, embedment, and backfilling operations.

F. Embedment material will be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement of the pipe."

PART 3: EXECUTION

3.1 PROTECTION OF EXISTING PROPERTIES

E. Exploratory Excavations

Delete paragraphs 1 through 4 in their entirety and add the following:

"1. The Contractor shall be responsible for locating all underground utilities associated with the Project. All costs associated with such exploratory excavations or "potholing", shall be at the Contractor's expense, and shall be considered incidental to the work."

3.3 TRENCH EXCAVATION

B. Trench Dimensions

Delete paragraph 1. and replace with the following:

"1. Trench dimensions shall be as indicated on the details on the plans. When plan details do not specify trench dimensions, excavate to the trench dimensions specified below."

3.4 DEWATERING

Delete paragraph A. in its entirety and replace with the following:

A. Remove all ground water or other water that may be encountered in trench excavations. Do not place pipe, bedding or backfill materials below the groundwater elevation established by dewatering operations. The cost of dewatering operations is considered a part of the excavation cost.

B. All dewatering efforts up to and including a 4" pump shall be considered incidental to the work. Efforts that require pumps larger than 4", in the opinion of the Engineer and based on field conditions, will be eligible for reimbursement via change order to be negotiated during construction.

3.6. TRENCH FILLING AND BACKFILLING

B. Pipe Bedding Placement

3. Type 2 Pipe Bedding – Delete.

C. TRENCH BACKFILL

1. Delete the last sentence and replace with the following:

"From the top of the Type 1 Pipe Bedding to 6 inches (15cm) below the ground surface, or to the subgrade elevation, material containing rock up to 6 inches in the greatest dimension may be used. All larger material must be removed and hauled to waste. Type A trench backfill will be required in all areas."

2. Delete Paragraphs a., b., and c. in their entirety and replace with the following:

"a. Type A Trench Backfill will be required for all backfilling operations on the Project, unless otherwise approved by the ENGINEER."

6. Delete Paragraphs a., b., and c. in their entirety and replace with the following:

"a. Type A Trench Backfill. Place trench backfill in maximum 8 inch compacted lifts within 3 percent of optimum moisture content, and compact to at least 95 percent of maximum dry density determined by AASHTO T99 or by ASTM D698."

PART 4: MEASUREMENT AND PAYMENT

Delete Parts 4.1 through 4.6 and replace with the following:

"4.1. GENERAL

A. No separate measurement and payment will be made for this item. All costs for this item shall be included in other items of the work. This shall include, but not necessarily limited to, costs associated with pipe bedding, backfilling and compaction, potholing of utilities, and removal and disposal of excess or unsuitable soils."

END OF SECTION 02221

SECTION 02230
STREET EXCAVATION, BACKFILL AND COMPACTION (MPWSS, as amended)

PART 1: GENERAL

1.1 DESCRIPTION

Add the following paragraphs:

"B. This item shall also include provisions for clearing, grubbing and demolition, tree stump removals, imported borrow provisions, and topsoil stripping and replacement.

C. Contractor shall comply with the requirements set forth within the Stata Geotechnical geotech report, dated January 13, 2017 included within Attachment A.

1.3 DENSITY CONTROL TESTING

A. Field Density Testing

Delete paragraphs 1.-3. and replace with the following:

"1. Meet the quality control and quality assurance requirements of section 01400. Comply with density requirements included herein and within Attachment A. In-place field density tests for quality assurance are at Contractor's expense meeting AASHTO T191 (ASTMD1556), Sand Cone Method; or AASHTO T310 (ASTMD6938), Nuclear Densometer methods. Quality assurance field density testing frequency shall be per Section 01400. Any failing tests shall be re-compacted and retested at contractor's expense."

B. LABORATORY MAXIMUM DENSITY AND OPTIMUM MOISTURE

Delete Paragraph 1. in its entirety and replace with the following:

"1. Quality control and quality assurance tests will be made by the Contractor for each onsite natural soil or each source of off-site material, including any borrow material, to determine the laboratory maximum density values and optimum compaction moisture content under AASHTO T99 or ASTM D698."

PART 2: PRODUCTS

2.2 IMPORTED BORROW MATERIALS (FOR EMBANKMENTS IN-PLACE)

Add the following paragraph:

"B. A borrow area has been designated within the project limits. Contractor shall remove all topsoil prior to beginning excavation. Borrow area shall be shaped to

the plan line and grades indicated on the Plans, or as approved by the Engineer. Borrow area slopes shall be re-seeding in conformance with section 02920.

PART 3: EXECUTION

Delete paragraph 3.1 in its entirety and replace with the following:

"3.1 CLEARING, GRUBBING AND DEMOLITION

A. Contractor shall be responsible for all clearing, grubbing and demolition as indicated on the plans or required to construction the project. This item shall include removal of all asphalt, concrete items, signage, shrubs, light poles, gates, incidental structures, miscellaneous surfacing and incidentals as indicated on the demolition plans or as required to construct the project. Not all items may be shown on the demolition plans that are required to be removed to complete the project. Contractor is responsible to review the project site prior to bidding the project to review clearing, grubbing and demolition items and include in their bid. Contractor will be required to fill the resulting voids of any demolition items in conformance with these specifications. Resulting voids shall be filled with suitable material from the site as approved by the Engineer. All areas shall be compacted to 98 percent of AASHTO T-99 if under roadway, or otherwise in conformance with the requirement of Attachment A."

3.4 EXCAVATION

Change "95%" to "98%" of maximum laboratory dry density determined by AASHTO T99 within paragraphs 1. and 2.

Add the following paragraph:

"G. STRIP TOPSOIL AND VEGETATION - Contractor shall strip all existing vegetation and topsoil, approximately 18 inches thick based on the Geotech report contained within Attachment A, over those areas required for new construction, to include areas of proposed roadways, camp sites, sidewalks, and associated work. Topsoil shall be stockpiled on site at a location determined by Contractor and approved by Owner. Topsoil shall be redistributed for use in conformance with the Plans, and Sections 02910 and 02920.

Delete paragraph 3.5 in its entirety and replace with the following:

"3.5 DISPOSAL OF EXCAVATED MATERIALS

A. Disposal

1. Dispose of all materials associated with clearing, grubbing and demolition items off the project site, with the exception of topsoil, in accordance with all applicable state and local regulations. Locate and provide suitable disposal areas.

3.8 EMBANKMENT PLACEMENT AND COMPACTION

B. Compaction

Change “95%” to “98%” of maximum laboratory dry density determined by AASHTO T99 or ASTM D698.

3.9 SUBEXCAVATION/REPLACEMENT BELOW SUBGRADE

E. Change “95%” to “98%” of maximum laboratory dry density determined by AASHTO T99 or ASTM D698.

Add the following sections:

“3.11 WATERING

A. The Contractor shall be responsible for providing the water required for executing all work including, but not limited to, any water needed to comply with optimum moisture content for embankment, dust control, and any additional requirements. Contractor shall secure all permitting, if necessary, for any water proposed for use on the site.

3.12 TREE STUMP REMOVAL

A. Contractor shall remove all tree stumps required to construct the project to the plan lines and grades, and dispose of off-site (tree removals to be performed by Owner prior to start of construction). Removal of tree stumps shall include the complete root ball, and Contractor will be required to fill the resulting voids in conformance with these specifications. Resulting voids shall be filled with suitable material from the site as approved by the Engineer. All areas shall be compacted to 98 percent of AASHTO T-99.”

B. The Contractor may prune certain trees needed for access and construction purposes with the Engineer’s approval. Tree limbs will be sawn cleanly and any excess debris removed from the site. The Contractor will coordinate with the Engineer on which limbs if any will be removed. The Contractor will not remove any limbs other than what is necessary for access and construction purposes. Trees not requiring removal shall be protected in conformance with Section 02905.

3.13 SUMMARY OF QUANTITIES

A. The Excavation Above Subgrade (cut) and Embankment In Place (fill and/or borrow) quantity calculations are included within the plans. The excavation quantity was determined by taking the existing surface minus 18 inches for topsoil allowance (with the exception of the lower campground – no allowance for topsoil included), and comparing it to the surface of the planned subgrade. The excavation quantities and borrow quantities listed in the Proposal are final, and will not be adjusted unless a change is made to the plan line and grades as approved by the Engineer.”

3.14 EXCESS EXCAVATION/TOPSOIL

A. Excess topsoil is anticipated on the project. Excess topsoil may be spread in areas indicated on the plans (C4.13) with prior approval of the Engineer. Any areas that received excess topsoil shall be re-seeded in conformance with sections 02910 or 02920.

3.15 EXISTING LANDSCAPING/ SURFACING /MISC ITEMS

A. All landscaping, borders, posts, existing underground sprinkler systems, ground covers such as beauty bark, rocks, gravel, boulders, logs and surfacing items such as concrete, existing asphalt and related items disturbed during construction shall be restored as nearly as possible to their original condition, or better, unless called for removal within the Drawings. The Contractor will coordinate with the Owner on any such items that will be removed. The Contractor will not remove any such items other than what is necessary for access and construction purposes.

3.16 HAUL ROAD

A. Existing asphalt roadway conditions will be reviewed prior to the start of construction. Contractor shall be responsible for removal and replacement to any damaged asphalt during construction operations. Contractor has the option to construct a haul road at the location shown on the plans to avoid damaging existing asphalt surfacing, and to minimize traffic control impacts. If Contractor elects to construct a temporary haul road, all costs associated with construction, to include topsoil removal and tree removals, shall be the contractor's responsibility. Haul road area shall be restored upon the completion of construction, to include topsoil and seeding. Construction of haul road and all related restoration items shall not be paid for directly, and shall be considered incidental to the work.

PART 4: MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Delete paragraph A. in its entirety and replace with the following:

"A. EXCAVATION ABOVE SUBGRADE – CUBIC YARD BASIS

1. Excavation Above Subgrade shall be paid for at the number of cubic yards listed in the Bid Form for "Excavation Above Subgrade". This quantity was computed from the plan lines and grades for the excavation required to construct new roadway, parking, and campsite sections as shown on the plans. The excavation quantity listed in the Bid Form is final, and will not be adjusted unless a change is made to the plan line and grades. Payment shall be full compensation for all labor, equipment, tools, and incidentals necessary to accomplish all clearing, grubbing, removals, hauling, disposal, and excavating to prepare the subgrade shown on the plans and described within these specifications.

2. Miscellaneous site grading such as backfill and restoration, items associated with erosion control (cut-off ditches, etc.), and any excavation work that may not be directly associated with the new roadway, parking, or campsite areas or not specifically shown on the typical sections or on the plans shall not be paid for directly, and shall be included in other pay items for which the grading is required."

B. SUBEXCAVATION/REPLACEMENT BELOW SUBGRADE

1. Delete "Subexcavation/Replacement Below" in the first sentence and insert "Excavation Above Subgrade – Cubic Yard Basis."

Delete the last sentence and add the following sentences:

"The holes created by the removal of unsuitable material shall be backfilled and compacted with suitable material generated on site from the excavation above subgrade if available. There will be no separate measurement and payment for backfilling with on-site material. If there is no suitable material on-site, then the holes shall be backfilled with special borrow as indicated below."

2. Payment is made under:

b. Delete paragraph in its entirety.

Delete paragraph C. in its entirety and replace with the following:

"C. SPECIAL BORROW

1. Imported borrow shall be paid for at the number of cubic yards listed in the Bid Form for "Special Borrow". This quantity was computed from the plan lines and grades for the embankment required to construct new roadway, parking, and camp site area improvements as shown on the plans. The imported borrow quantity listed in the Bid Form is final, and will not be adjusted unless a change is made to the plan line and grades. Payment shall be full compensation all labor, equipment, tools, and other incidentals necessary to secure borrow material, haul, place, level, manipulate, compact the embankment material, and perform other work for embankment construction in accordance with the specifications."

Add the following paragraphs:

"4.2 TOPSOIL STRIPPING

A. Measurement and payment for topsoil stripping shall be per the cubic yard as listed in the Proposal. The topsoil stripping depth was computed at 18 inches, and the quantity was computed from the plan lines and grades for the excavation limits to complete improvements for the middle and upper campground areas. The topsoil quantity listed in the Bid Form is final, and will not be adjusted unless a change is made to the plan line and grades. The topsoil area for the lower

campground area is minimal, and shall not be paid for directly. Areas outside of the roadway excavation limits, to include utility construction, trail construction, borrow areas, haul roads, and miscellaneous construction shall not be paid for directly and shall be considered incidental to the work.

4.3 CLEARING, GRUBBING AND DEMOLITION

B. Measurement and payment for clearing, grubbing, and demolition shall be paid for per the lump sum item listed in the Proposal. Payment shall include full compensation for all excavation, saw-cutting, removal, backfill and compaction as required, loading, hauling, and removal from site, any dumping fees, labor, equipment, material, and incidentals required to complete the work as shown on the plans and described within this special provisions.

4.4 TREE STUMP REMOVAL

A. Tree stump removals shall be paid for per the each as indicated in the proposal. Payment shall include full compensation for complete stump and root ball removal, disposal, and backfill and compaction of void area as indicated within these specifications. The bid quantity listed in the proposal was based on surveyed trees that require removal to complete the improvements. The bid quantity is final. Additional tree or stump removals required for additional construction, to include utilities, haul roads and related items, shall not be paid for directly and shall be considered incidental to the work."

END OF SECTION 02230

02230 STREET EXCAVATION, BACKFILL AND COMPACTION

ATTACHMENT A

GEOTECHNICAL REPORT (January 13, 2017)

STRATA
A Professional Services Corporation
Integrity From the Ground Up

January 13, 2017
File: MI16091A

Mr. Andy Schultz, EIT
WGM Group
1111 East Broadway
Missoula, Montana 59802

RE: **Pavement Section Evaluation**
Finley Point Campground Improvements
Polson, Montana

Greetings Andy:

Strata, A Professional Services Corporation (STRATA) is pleased to provide this report summarizing our pavement section evaluation to assist WGM Group (WGM) and the Montana Fish Wildlife and Parks (FWP) with the planned campground improvements. The attached report summarizes field and laboratory test results and presents our geotechnical opinions and recommendations regarding the planned improvements. This report must be read, understood, and implemented in its entirety. Portions of this report or attachments cannot be relied upon outside the context of the entire document.

We assessed subsurface conditions within the selected improvement area and prepared this report based on our current project understanding, estimated traffic loads, field and laboratory test results, and our previous experience with roadway pavement design. The findings herein present the recommendations for the campground improvements relating to the asphalt drive and parking areas.

We appreciate this opportunity to continue our professional relationship with the WGM and the opportunity to assist you with this evaluation. Please contact us if you have any questions or comments.

Sincerely,
STRATA

Aaron Lewis, P.E.
Project Engineer

AWL/AJA/ck

Andy J. Abrams, P.E.
Senior Engineer

5653 Alloy South Missoula, Montana 59808 Phone.406.829.1600 Fax.406.829.1610
www.stratageotech.com

Pavement Section Evaluation
Finley Point State Park Campground Improvements
Finley Point Campground
Polson, Montana

PREPARED FOR:
Mr. Andy Schultz, EIT
WGM Group
1111 E. Broadway
Missoula, Montana 59802

PREPARED BY:
STRATA
A Professional Services Corporation
5653 Alloy South
Missoula, Montana 59808
Telephone: (406) 829-1600
Facsimile: (406) 829-1610

January 13, 2017

TABLE OF CONTENTS

Page

REPORT TABLES

PLATE AND APPENDIX

Pavement Section Evaluation
Finley Point Campground Improvements
Polson, Montana

INTRODUCTION

STRATA accomplished subsurface exploration to evaluate soil conditions within the proposed campground improvements area at the Finley Point State Park Campground near Polson, Montana. STRATA performed our services referencing our October 6, 2016 proposal. This report summarizes the field exploration results, laboratory testing, asphalt pavement section design, and related geotechnical recommendations. Portions or individual sections of this report cannot be relied upon without the supporting text of other pertinent sections. To provide this evaluation, we accomplished the following:

1. Reviewed site plans to identify desired exploration locations and coordinated with WGM to establish an appropriate schedule for exploration. WGM staked the selected exploration locations and contacted the facility owners to provide exploration equipment.
2. Visited the site with WGM representative, Mr. Andy Schultz, EIT to observe exploration. Our geotechnical engineer visually described and classified the soil encountered during exploration, referencing *ASTM International* (ASTM D2488) procedures, and obtained select soil samples for laboratory testing.
3. Performed laboratory testing referencing *ASTM International* (ASTM) or *American Association of State Highway and Transportation Officials* (AASHTO) test standards to help assist soil classification, estimate soil engineering properties, and correlate subgrade strength. The laboratory testing program included gradation distributions, California Bearing Ratio (CBR) testing, Moisture Density Relationship (Proctor), and in-situ moisture testing.
4. Reviewed the subsurface conditions, laboratory test results, and the proposed construction to formulate our geotechnical recommendations to assist in project design and construction.
5. Prepared and provided 1 electronic copy of our geotechnical deliverable presenting our engineering opinions and recommendations, exploration, and laboratory test results.

PROJECT UNDERSTANDING

STRATAôs project understanding is based on the email correspondence with Mr. Andy Schultz, EIT, on October 3, 2016;, a review of plans by WGM Group labeled ñ*Finley Point State Park Campground Lake County Montana Preliminary Improvements Plan"*, dated July 2016; and previous experience with similar soil conditions near the site.

Existing Site Conditions

The project site encompasses an unimproved forested area west of the lakefront facilities. at the Finley Point State Park Campground near Polson, Montana (shown in Figure 1). The legal description of the parcel is ôS18 T23 N, R19 W, RTS IN GOVT LOT 3 & IN SWNEô The parcel is bordered to the west by Flathead Lake, to the east by South Finley Point Road, and to the north and south by private, un-improved land. The proposed improvements are to occur on a slightly sloping (to the west) hillside above Flathead Lake. The unimproved land is currently vegetated with grasses, small shrubs, and trees.

A review of local geologic maps indicate the site is immediately underlain by native Quaternary gravel, sand, and silt deposits within the upper 50.0 feet below ground surface (bgs). Review of local well logs, published by the Montana Ground Water Information Center, indicates the consistent static groundwater table is approximately 50 to 75 feet bgs. However, seasonal weather may affect the groundwater levels.

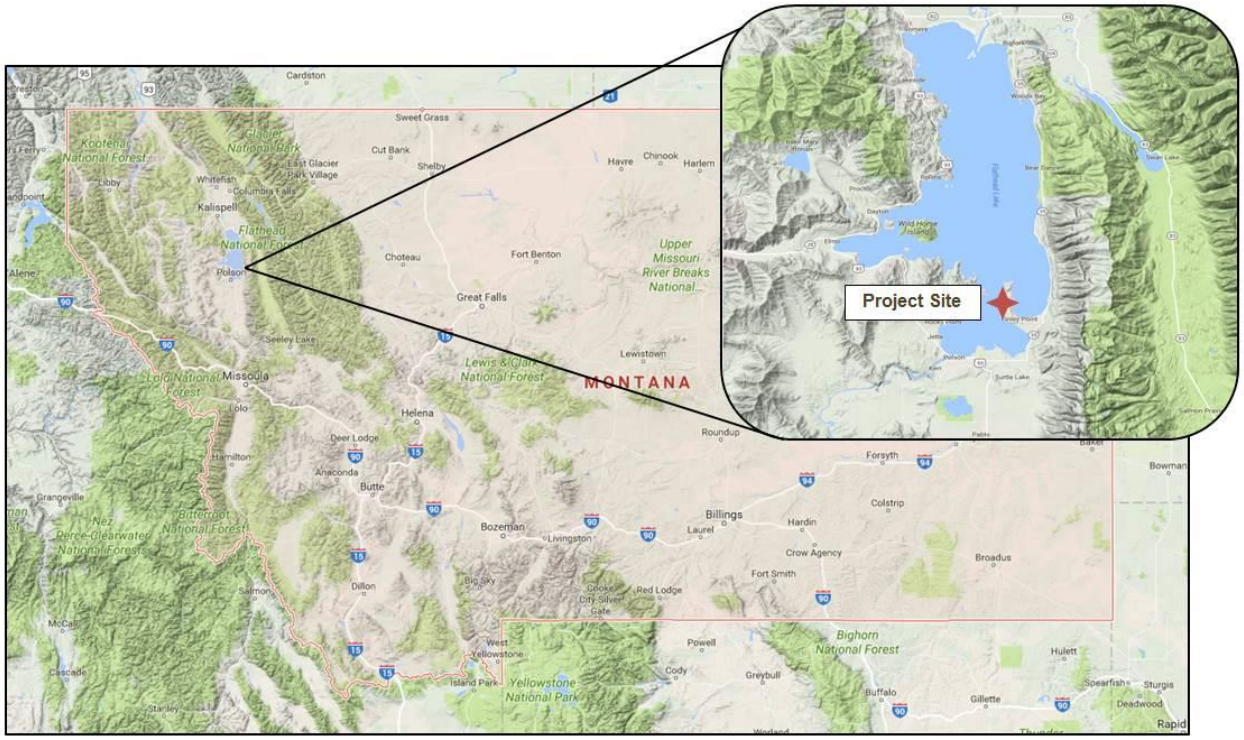


Figure 1. Project Location

Proposed Construction

STRATA reviewed the project plans labeled *'Finley Point State Park Campground Lake County, Montana Preliminary Improvements Plans'* which were prepared and provided by WGM, dated July, 2016. These plans depict the proposed improvements, including 12 campsites, two camp host stalls, and one information board connected via a looped roadway; all of which are paved. The plan set also depicts water, sewer, and electrical utility lines that will be installed as part of the proposed improvements. These utilities will service the campground and connect into existing utilities. Some site grading will be required to level the area of the proposed improvements. The preliminary plans do not depict the site grading at this time. Anticipated traffic loading was not provided to STRATA at the time of this report, but will likely include light duty vehicles, class a motorhomes, and maintenance/utility vehicles.

FIELD AND LABORATORY EVALUATION

STRATA evaluated the site geologic conditions by performing subsurface exploration and laboratory testing as described in the following sections.

Field Exploration

STRATA accomplished 3 test-pits in the approximate locations shown on Plate 1, *Exploration Location Plan.* These locations had been staked by WGM prior to the exploration. A CASE 580 Rubber-tired backhoe and equipment operator were arranged by WGM to excavate test-pits under STRATA's observation. The test-pits were excavated to an approximate depth of 5.0 feet below the existing ground surface to reveal the soil conditions and to collect samples. STRATA's geotechnical engineer visually classified, described, and logged the soil profile encountered, referencing the Unified Soil Classification System (USCS) ASTM D2487 and ASTM 2488. Appendix A presents exploration logs and a USCS explanation, which should be used to interpret the soil descriptions in this report and on the individual logs. Upon completion, the test-pits were loosely backfilled to present a level surface.

Laboratory Testing

Select soil samples were designated for laboratory testing to assess soil engineering characteristics. Tests were performed on samples collected at select depths and locations as noted on the exploration logs in Appendix A. Tests performed included:

- Moisture Content
- Gradation Distribution
- Moisture Density Relationship (Proctor)
- California Bearing Ratio (CBR)

STRATA accomplished the laboratory test program referencing ASTM or AASHTO test procedures to help develop a soil model and perform pavement section design. STRATA will retain excess soil samples for 60 days following issuance of this report, unless STRATA receives written notification to retain the samples for a longer time period.

SUBSURFACE CONDITIONS

The following section describes the soil conditions encountered at the site. Detailed exploration logs are provided in Appendix A along with a USCS summary that should be used to interpret the boring logs.

The three test-pits, TP-1, TP-2, and TP-3, displayed similar lithology as described herein. The upper 1.0 foot of soil consisted of dark brown topsoil with organics including roots and decaying plant matter. Beneath the topsoil, in TP-1 and TP-2, was a light brown sand layer 6-inches thick that also contained some organics. Beneath this layer, extending from 1.5-feet to termination depth of 5.0-feet, existed a poorly graded gravel with sand, silt, and cobbles. The

cobbles in this layer were observed to be multicolored, sub-rounded to rounded, and up to 4-inches in diameter with one cobble being 10.0 inches in diameter in TP-3. The sand was coarse to fine in texture while little fines were present. Digging became more difficult near termination depth of the test-pits. Groundwater was not encountered during the test-pitting operations.

GEOTECHNICAL OPINIONS AND RECOMMENDATIONS

Earthwork

Test Pit Remediation

All test pits located within the proposed improvements area shall be remediated during earthwork construction. Test pit remediation should extend to the exploration depths and remediation (backfilling and compaction) should comply with the recommendations presented in the *Soil Product Specification* and *Required Compaction* sections below. STRATA should be retained to perform testing and observation during test pit remediation.

Site Stripping

Topsoil containing organics extended to a depth of 18-inches at the exploration locations. Soil containing vegetation and organics, over 3 percent, must be removed from the proposed improvements and all structural fill areas. Based on the exploration results, we recommend WGM or the selected contractor assume a minimum 18-inch topsoil stripping depth. Stripping of soil containing organics must extend laterally at least 3.0 feet outside of the planned improvement areas. Soil containing vegetation and organics should be disposed off-site, or may be reused on-site for landscaping, but may not be re-used as general structural fill, per Table 1.

Establishing Subgrades

Following site stripping and excavation to achieve the planned subgrade elevation, and prior to site improvements, prepare subgrades according to the following bullets:

- Native gravel and sand:
  - Excavate to the prescribed subgrade depth.
  - Scarify to a depth of 12-inches, moisture condition, and compact to 98% of the standard Proctor.

Once prepared and approved by the geotechnical engineer, it is the contractor's responsibility to protect subgrades from degradation, freezing, saturation, and other disturbances. We recommend project earthwork specifications specifically outline that the contractor is required to maintain the subgrade in a compacted condition and protect subgrades

from construction traffic and other disturbances after they have been prepared and meet compaction requirements.

Our opinion is careful construction and earthwork procedures will be critical to achieving adequate subgrade preparation and reducing over-excavation. Specifically, these procedures could include, but are not limited to, carefully staging equipment and/or stockpiles, routing construction equipment away from subgrades, and implementing site drainage procedures to help reduce saturating subgrades during wet weather conditions. Excavations for contractor convenience, or to repair damage by contractor equipment, shall be accomplished at no additional cost to the owner. STRATA will remain available to consult with the owner, the project team, and the contractor as the project moves forward regarding subgrade preparation procedures.

Excavation Characteristics

We anticipate the on-site soil may be excavated using conventional soil excavation techniques. The contractor should be prepared to encounter boulders up to 10.0 inches in diameter as a cobble of this size was encountered in TP-3. Slopes and excavations must be constructed, shored, or braced in accordance with the *Occupational Safety and Health Administration* (OSHA) regulations and local codes. Based on the exploration and laboratory testing, site soil within the planned project footprint may be classified as soil type ñCò according to OSHA requirements. As such, we recommend provisions be made to allow temporary excavations of any type to be sloped back to at least 1.5H:1V (horizontal to vertical), or as otherwise determined to be safe according to the selected contractorôs ñcompetent personò Surface water infiltration and construction vibrations may require slopes to be temporarily flattened. Ultimately, the selected contractor is responsible for site safety and determining appropriate excavations for the conditions and soil types encountered during construction. STRATA accepts no responsibility for temporary excavation stability.

Groundwater is not anticipated to affect construction operations for this project, which is assumed to disturb soil no greater than approximately 5 feet below existing grades.

Soil Product Specifications

We recommend all fill placed beneath the pavement section consist of *General Structural Fill* meeting the requirements presented in Table 1. The on-site native gravel soil is

expected to be suitable for re-use as *General Structural Fill*, but will require moisture-conditioning prior to placement.

Table 1. Soil Fill Specifications and Allowable Use

Soil Product	Allowable Use	Material Specifications
Non-Structural Fill (Landscape Fill)	• Areas that will not contain structures (typically landscape areas)	Soil must be classified as GP, GM, GW, GC, SP, SM, SW, SC, CL, or ML according to the USCS. Soil may not contain particles larger than 12 inches in median diameter. Soil must be reasonably free from organics, vegetation, wood, metal, plastic, or other deleterious substances.
General Structural Fill	• Site grading, outside pavement support sections.	Soil classified as GP, GM, GW, SP, SM, or SW according to the USCS. Soil may not contain particles larger than 6 inches in median diameter. Soil must contain less than 3 percent (by weight) of organics, vegetation, wood, or other deleterious substances.
Crushed Base Course	• General Structural Fill uses • Pavement section support aggregate • Over-excavations	Soil meeting requirements stated in *Section 02235 – Crushed Base Course* of MPWSS Standards.
Unsatisfactory Soil	• NONE	Soil classified as CH, MH, OH, OL or PT **may not** be used at the project site. Any soil type not maintaining moisture contents within 3 percent of optimum during compaction. Any soil containing more than 3 percent (by weight) of organics, vegetation, wood, metal, plastic, or other deleterious substances.

Required Compaction

General Structural Fill must be placed to the subgrade elevations in uniform and maximum 12-inch-thick, loose lifts, and compacted to the requirements listed in Table 3 below. *General Structural Fill* should be placed over subgrades prepared as recommended herein, reviewed, and approved by STRATA. *General Structural Fill* placement and compaction shall be performed in a manner that creates a relatively uniform structural fill, free from pumping and rutting. Appropriate equipment, weighing at least 10 tons, is required to achieve compaction requirements. Accurately documenting that structural fill compaction requirements are met

throughout fill placement is an important geotechnical requirement. Landscaping fill compaction requirements shall be established by the Landscape Architect. Table 3 summarizes soil product compaction requirements.

Table 2. Required Structural Fill Compaction for Designated Project Areas

Project Area	Required Soil Product	Compaction Requirement[1]
Subgrades beneath pavements	Native Gravel	98%
Directly beneath pavements	Crushed Base Course	98%
Utility trench backfill	Native Gravel	98%
Landscape areas sloped flatter than 5H:1V	Landscape Fill	90%

1. Reference AASHTO T 99 Standard Proctor

Imported *Structural Fill* products may not be suitable for conventional Proctor and field density testing if they are coarse, containing more than 30 percent particles retained on the No. IJ sieve (i.e., oversize material). If excessive oversize material is present within the imported *General Structural Fill*, we recommend oversize material be compacted using a õmethod specificationò Method compaction should occur by applying at least 5 complete passes over the soil using vibratory compaction equipment with a drum energy rating of at least 10 tons. Method compaction should be observed on a full-time basis by STRATA and should achieve a firm, unyielding, and interlocking surface.

Wet Weather, Wet Soil Construction, and Over-Excavations

We strongly recommend earthwork construction take place during dry weather conditions. In soft or wet soil areas and during wet weather conditions, earthwork contractors must be familiar with the hazards of using rubber-tired equipment, which exerts a point load on the subgrade. Staggering wheel paths, using tracked equipment to traverse exposed subgrades, and other construction techniques are important processes that reduce the potential for subgrade pumping, rutting, and contractor rework. We strongly recommend construction traffic be controlled in a manner that reduces traffic directly on the sensitive soil subgrade.

Earthwork should not be performed immediately after rainfall, or until soil can dry sufficiently to allow construction traffic without disturbing the subgrade. We recommend any soil exhibiting pumping, rutting, weaving, or otherwise exhibiting unstable performance be moisture-conditioned (typically drying) and recompacted to *General Structural Fill* requirements, or

removed at the contractorôs and/or ownerôs discretion.

PAVEMENT SECTION ANALYSES AND FINDINGS

The following pavement section design recommendations are provided referencing the AASHTO *Guide for Design of Pavement Structures* (1993). STRATA estimated traffic loading and design parameters based on typical flexible pavement design criteria in the western Montana area, results from laboratory testing, and our understanding of the subsurface conditions. Tables 3 and 4, and the subsequent discussion, present our design parameters and references as well as the resulting pavement section design recommendations.

Table 3. Flexible Pavement Design Parameters

Design Parameter	Value Used	Reference
Reliability (R)	80%	Typical Montana area values
Standard Deviation (S)	0.45	AASHTO 1993 guidelines
Initial Serviceability (PSI_i)	4.2	Typical Montana area values
Terminal Serviceability (PSI_z)	3.0	Typical Montana area values
Traffic Loading	30,000 ESALS[1]	Estimated value based on 20 year life
Design Life	20 years	Typical Montana area values
Resilient Modulus (M_r)	21,000 psi[2]	Based on correlations to CBR and soil type
Asphalt Layer Coefficient	0.42	Typical Montana area values
Base Course Layer Coefficient	0.12	Typical Montana area values
Base Course Drainage Coefficient	1.00	Table 2.4 AASHTO 1993 for ñgoodò drainage, 1 to 5 percent saturation

1. Equivalent Single-Axle Loads (ESALs).
2. Pounds per square inch (psi).

The traffic loads we used in our analysis are estimates only. If actual loading is different, STRATA must review our analysis commensurate with the actual traffic loads. Based on published CBR and resilient modulus correlations, and our experience with resilient modulus testing, we estimate the native gravel will exhibit a resilient modulus value of 21,000 pounds per square inch (psi), provided the subgrade is prepared as recommended in the Earthwork report section. Based on the above pavement design parameters, Table 4 provides our flexible pavement design recommendations for pavements.

Table 4. Flexible Pavement Section Design

Pavement Section Material	Recommended Section Thickness (inches)	Material Specifications
Asphalt Pavement	3.0	Hot-mix asphalt (HMA) conforming to *Sections – 02510 Asphalt Concrete Pavement* of the latest edition of MPWSS Standards.
Crushed Base Course	6.0	Meeting *Crushed Base Course* requirements in Table 1

Pavement Maintenance and Drainage

We recommend crack maintenance be accomplished on all pavement surfaces every 2 to 3 years to reduce the potential for surface water infiltration into the underlying pavement subgrade. Surface and subgrade drainage are extremely important to the performance of the pavement section. Therefore, we recommend the subgrade, crushed base course, and paved surfaces slope at no less than 2 percent to an appropriate storm-water disposal system or other appropriate location. The pavement's life will be dependent upon achieving adequate drainage throughout the section and especially at the subgrade elevation. Water ponding at the pavement subgrade surface can induce heaving during the freeze-thaw process, which can readily damage pavement. Fill areas that could settle after construction may exhibit small surface depressions that have poor subgrade support and can lead to cracking and additional water infiltration. STRATA recommends the owner annually review pavement surface performance to help identify and address any pavement maintenance issues.

The above pavement sections assume the pavement subgrade will be prepared as described in the *Establishing Subgrades* report section. We recommend STRATA be retained to observe proof-rolling of the pavement subgrade to identify areas that deviate from what we have assumed for design and to help identify soft, rutting or pumping soil areas, or other potentially problematic conditions.

EVALUATION LIMITATIONS

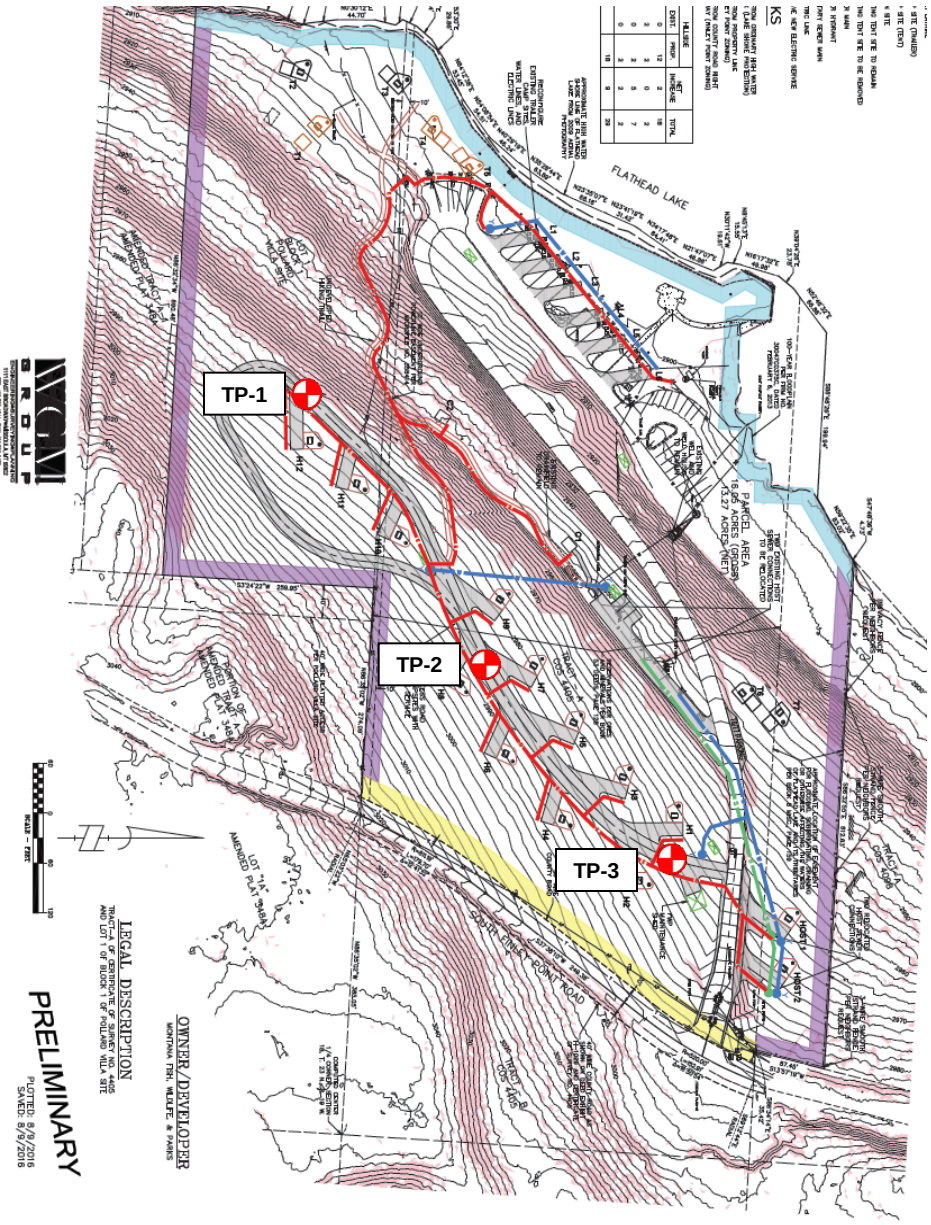
This report has been prepared to evaluate the existing pavement section and subgrade conditions for campground improvements, including 12 new campsites and an access drive at the Finley Point State Park Campground near Polson, Montana. Our services consist of professional opinions and recommendations made in accordance with generally accepted

geotechnical engineering principles and practices as they exist at this time in the western Montana region. This report has been prepared exclusively for the use of WGM and we do not authorize its use to any other parties. This report pertains to the improvements described herein, and must not be extrapolated to other improvements such as buildings, retaining walls, or other future improvements. This acknowledgement is in lieu of any express or implied warranties.

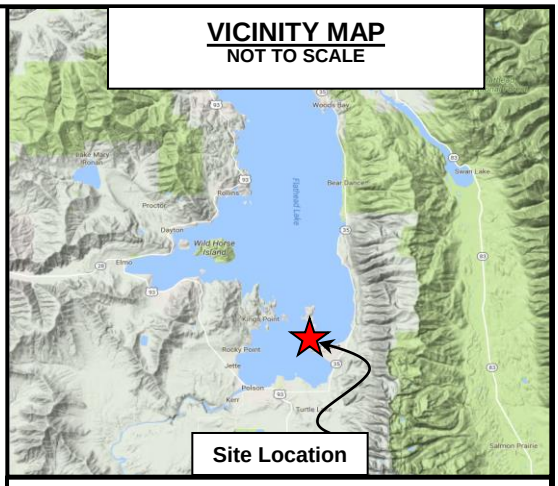
Although soil conditions encountered in locations explored were relatively consistent with respect to soil type, exploratory test-pits only allow observation of a relatively small sample of the subsurface conditions at the site. Variations may exist between and beyond exploration locations. Such variations will not be apparent until construction and may impact project schedules and costs. Where such variations exist, it may affect the opinions and recommendations presented in this report as well as construction timing and costs, and STRATA must be contacted to review the encountered conditions and our recommendations to make any necessary revisions. See the *Evaluation Limitations* section of this report for further discussion on variability and risk assessment.

The following plate and appendix accompany this report:

Plate 1:	Exploration Location Plan
Appendix A:	Unified Soil Classification System Exploration Logs
Appendix B:	Laboratory Test Results



VICINITY MAP
NOT TO SCALE



LEGEND

Approximate borehole locations observed by STRATA.

EXPLORATION LOCATION PLAN

Finley Point Campground Improvements
Finley Point
Polson, Montana

STRATA
A PROFESSIONAL SERVICES CORPORATION
Integrity from the Ground Up

MI16091A	PLATE 1

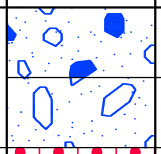
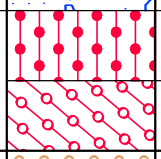
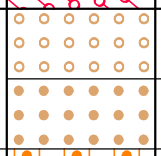
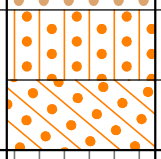
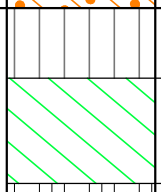
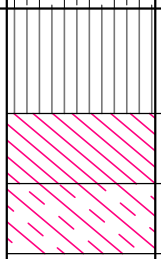
THIS PLAN COMPRISES A PORTION OF STRATA'S GEOTECHNICAL REPORT AND THE TEXT OF THE REPORT CONTAINS ESSENTIAL INFORMATION. BEFORE UTILIZING THIS PLAN FOR ANY PURPOSE WHATSOEVER, THE REPORT SHOULD BE READ COMPLETELY. THIS PLAN IS INTENDED TO INDICATE APPROXIMATE LOCATIONS OF GEOTECHNICAL EXPLORATIONS, TESTS AND OTHER GEOTECHNICAL ISSUES (REFER TO TEXT FOR INFORMATION ON METHODS, RESULTS AND SUBSEQUENT RECOMMENDATIONS). THESE LOCATIONS AND INFORMATION WERE ADDED TO EXISTING PLANS OF THE SITE PREVIOUSLY PREPARED BY OTHERS AND NO CHECK OF ACCURACY, APPROPRIATENESS, ETC., OF INFORMATION PROVIDED BY OTHERS WAS PERFORMED SINCE SUCH CHECKS WERE NOT PART OF STRATA'S SCOPE OF WORK.

Reference: WGM produced drawing. No Scale Intended

APPENDIX A

Unified Soil Classification System (USCS) and Exploration Logs

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL NAMES
COARSE GRAINED SOIL	GRAVEL	CLEAN GRAVEL		GW	Well–Graded Gravel, Gravel–Sand Mixtures.
				GP	Poorly–Graded Gravel, Gravel–Sand Mixtures.
		GRAVEL WITH FINES		GM	Silty Gravel, Gravel–Sand–Silt Mixtures.
				GC	Clayey Gravel, Gravel–Sand–Clay Mixtures.
	SAND	CLEAN SAND		SW	Well–Graded Sand, Gravelly Sand.
				SP	Poorly–Graded Sand, Gravelly Sand.
		SAND WITH FINES		SM	Silty Sand, Sand–Silt Mixtures.
				SC	Clayey Sand, Sand–Clay Mixtures.
FINE GRAINED SOIL	SILT AND CLAY LIQUID LIMIT LESS THAN 50%			ML	Inorganic Silt, Sandy or Clayey Silt.
				CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
				OL	Organic Silt and Clay of Low Plasticity.
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	Inorganic Silt, Micaceous Silt, Plastic Silt.
				CH	Inorganic Clay of High Plasticity, Fat Clay.
				OH	Organic Clay of Medium to High Plasticity.
				PT	Peat, Muck and Other Highly Organic Soil

BORING LOG SYMBOLS

- Standard 2–Inch OD Split–Spoon Sample
- California Modified 3–Inch OD Split–Spoon Sample
- Rock Core
- Shelby Tube 3–Inch OD Undisturbed Sample

GROUNDWATER SYMBOLS

- Groundwater After 24 Hours
- (7–3–07) Indicates Date of Reading
- Groundwater at Time of Drilling

TEST PIT LOG SYMBOLS

- BG — Baggie Sample
- BK — Bulk Sample
- RG — Ring Sample

Shorthand Notation:
BGS = Below Existing Ground Surface
N.E. = None Encountered

STRATA
A Professional Services Corporation
Integrity from the Ground Up

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(TOPSOIL) - SILT, With Organics And Vegetation, (ML) dark brown, moist	0.0	ML								
POORLY GRADED SAND WITH SILT, With Organics, (SP-SM) brown, moist		SP-SM								
POORLY GRADED GRAVEL WITH SILT AND SAND, With Cobbles, (GP-GM) tan, subrounded, moist	2.5	GP-GM		BK			4.9			
Test Pit Terminated at 5.0 Feet.	5.0									

Client: WGM Group	**Test Pit Number:** TP-1
Project: MI16091A	**Date Excavated:** 10-19-2016
Backhoe: CASE 580	**Bucket Width:**
Depth to Groundwater: N.E.	**Logged By:** AWL

STRATA
A Professional Services Corporation
Integrity from the Ground Up

EXPLORATORY TEST PIT LOG

Sheet 1 Of 1

STRATA TEST PIT - STRATA.GDT - 1/13/17 13:41 - Z:\DOCUMENTS\MAIN\CLIENTS\WWGM GROUP INC\MI16091A FINLEY POINT PAVEMENT SECTION GEE\ELECTRONIC LOGS\MI16091A LOGS REV 1.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(TOPSOIL) - SILT, With Organics And Vegetation, (ML) dark brown, moist	0.0	ML								
POORLY GRADED SAND WITH SILT, With Organics, (SP-SM) brown, moist		SP-SM								
POORLY GRADED GRAVEL WITH SILT AND SAND, With Cobbles, (GP-GM) tan, subrounded, moist	2.5	GP-GM		BK						
Test Pit Terminated at 5.0 Feet.	5.0									

Client: WGM Group	**Test Pit Number:** TP-2	STRATA A Professional Services Corporation Integrity from the Ground Up	**EXPLORATORY TEST PIT LOG**
Project: MI16091A	**Date Excavated:** 10-19-2016		
Backhoe: CASE 580	**Bucket Width:**		
Depth to Groundwater: N.E.	**Logged By:** AWL		Sheet 1 Of 1

STRATA TEST PIT - STRATA.GDT - 1/13/17 13:42 - Z:\DOCUMENTS\MAIN\CLIENTS\WWGM GROUP INC\MI16091A FINLEY POINT PAVEMENT SECTION GEE\ELECTRONIC LOGS\MI16091A LOGS REV 1.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
(TOPSOIL) - SILT, With Organics And Vegetation, (ML) dark brown, moist	0.0	ML								
POORLY GRADED GRAVEL WITH SILT AND SAND, With Cobbles, (GP-GM) tan, subrounded, moist	2.5	GP-GM		BK	8.0		3.8			
Test Pit Terminated at 5.0 Feet.	5.0									

Client: WGM Group	**Test Pit Number:** TP-3	STRATA A Professional Services Corporation Integrity from the Ground Up	**EXPLORATORY TEST PIT LOG**
Project: MI16091A	**Date Excavated:** 10-19-2016		
Backhoe: CASE 580	**Bucket Width:**		
Depth to Groundwater: N.E.	**Logged By:** AWL		Sheet 1 Of 1

STRATA TEST PIT - STRATA.GDT - 1/13/17 13:42 - Z:\DOCUMENTS\MAIN\CLIENTS\W\WGM GROUP INC\MI16091A FINLEY POINT PAVEMENT SECTION GEE\ELECTRONIC LOGS\MI16091A LOGS REV 1.GPJ

APPENDIX B
Laboratory Test Results

CALIFORNIA BEARING RATIO

ASTM D1883

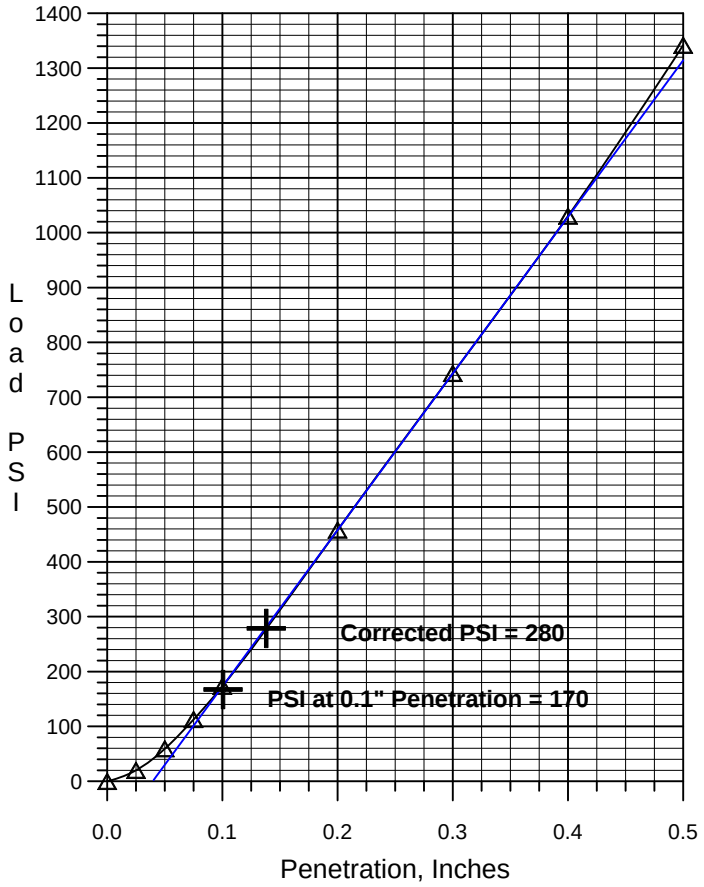
Project: Finley Point Pavement Section
Client: WGM Group, Inc.
File: MI16091A
Sample Location: Test Pit TP-2 from 2.0 to 2.5 feet BGS
Sample Description: GRAVEL with Silt and Sand

Lab Number: MI1600174
Date Sampled: October 19, 2016
Dates Tested: November 3-7, 2016
Sampled By: A. Lewis
Tested By: R. Matteson

SOIL CONSTANTS

CBR = 28
Test Dry Density 124.9 pcf (96 % of max)
Test Specimen Molded at 7.1 % Moisture
Test Performed at 6.8 % Moisture (Top 1" after soak)
Soak Duration: 97 hours
Percent Swell = - 0.04
Surcharge (psf) = 75

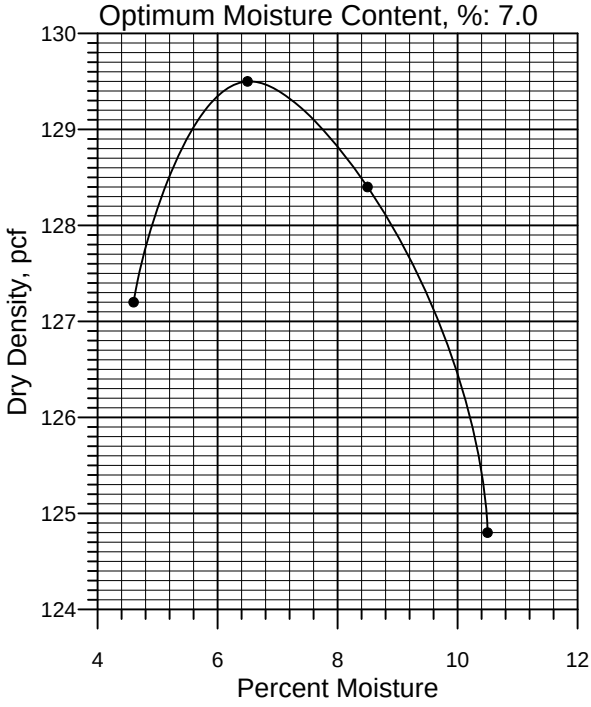
CBR CURVE



MOISTURE-DENSITY CURVE

AASHTO T99

Method: D
Maximum Dry Density, Pcf: 129.5
Optimum Moisture Content, %: 7.0

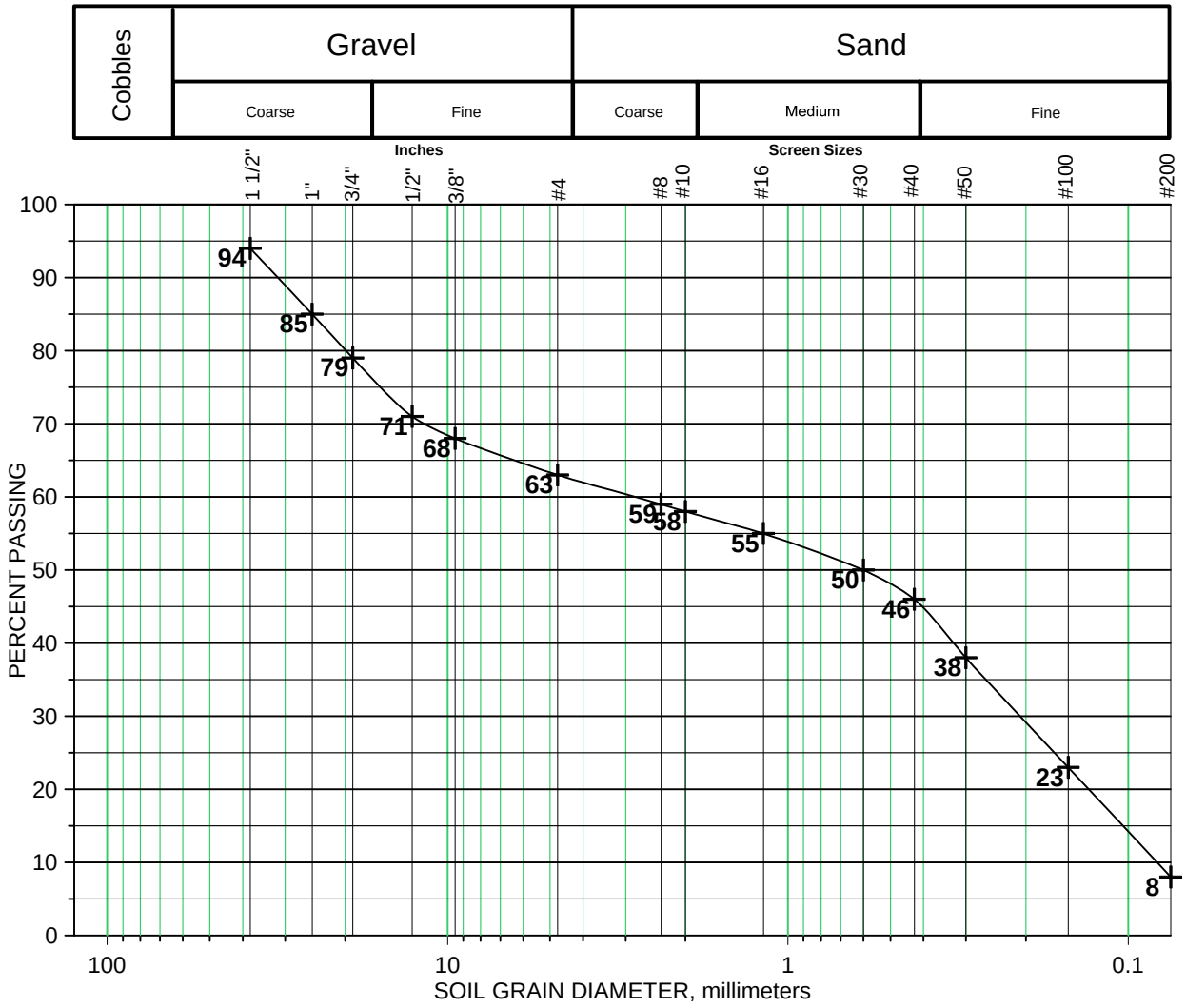


Reviewed by:_____

STRATA
A Professional Services Corporation
Integrity From the Ground Up

GRADATION ANALYSIS
ASTM C136, 117

Project: Finley Point Campground Improvements
Client: WGM Group
Project Number: MI16091A
Lab Number: MI1600183
Material Source: TP-3 @ 4.5' BGS
Sample Classification: Poorly Graded Gravel with Sand and Silt, (GP-GM) Tan, moist
Date Sampled: 10/19/2016 by A. Lewis (STRATA)



Reviewed by: Aaron W. Lewis, P.E.

STRATA
A Professional Services Corporation
Integrity from the Ground Up

SECTION 02235
CRUSHED BASE COURSE (MPWSS, as amended)

PART 2: PRODUCTS

2.2 CRUSHED BASE MATERIAL

Delete “recycled concrete and/or asphalt” within paragraph A.

2.3 GRADATION

Add the following to the end of paragraph A:

> “The material furnished shall meet the requirements of the ¾ inch minus gradation.”

PART 3: EXECUTION

3.3 FILED DENSITY REQUIREMENTS

Delete paragraph C. in its entirety and replace with the following:

> “C. Provide the watering and rolling required to obtain a minimum field density of 98 percent of maximum dry density as determined by AASHTO T99, in conformance with the geotechnical report contained within section 02230 Street Excavation, Backfill and Compaction (Attachment A). No separate compensation is made for rolling and watering the base course to achieve the compaction requirements.”

PART 4: MEASUREMENT AND PAYMENT

Delete 4.1, 4.2, and 4.3 in their entirety and replace with the following:

“4.1 CRUSHED BASE COURSE

A. This item shall be measured and paid for by the square yard basis as indicated on the proposal. The square yard quantity was calculated off the plans for the roadway construction and camp site areas as shown and per the details and typical sections shown on the plans. Payment shall be made under ¾” Minus Crushed Base Course for the thickness listed in the proposal, and shall constitute full compensation for furnishing, loading, hauling, spreading, blending, shaping, watering, and compacting the sub-base course material, and for all tools, labor and incidentals necessary to complete this item. The quantity listed in the bid form shall be final unless the Engineer approves a change to the plan lines and grades.

B. ¾” crushed base course used to construct the 2’ gravel shoulders shall be measured and paid for per the Linear Foot of shoulder as indicated in the proposal.

C. ¾” crushed base course used to construct the gravel trail shall be paid for by the Linear Foot as listed in the Proposal, meeting the thickness and width as

indicated on the plans.

D. Miscellaneous ¾" crushed base course used for those items not specifically called for payment above, shall not be paid for directly and shall be considered incidental to the item of work for which it is related. This shall include foundation gravels for concrete items, building foundation, etc. shall not be paid for directly and shall be considered incidental to related bid item. "

END OF SECTION 02235

SECTION 02250
WATERING (MPWSS, as amended)

PART 1: GENERAL

1.1 WATERING

A. The Contractor shall be responsible for providing the water required for executing his work, to include, but not limited to, water used for dust control and water used to create adequate moisture content in material incorporated into the work.

PART 4: MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Unless specifically noted otherwise, all watering included in the work shall be incidental to other work items in the contract and no separate payment shall be made.

END OF SECTION 02250

SECTION 02270
SOIL EROSION AND SEDIMENT CONTROL (*Added Section*)

PART 1: GENERAL

1.1 SUMMARY

A. STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES

1. The Contractor is responsible for creating and filing a Notice of Intent (NOI) Form and Storm Water Pollution Prevention Plan (SWPPP) for this project under the current Montana Pollutant Discharge Elimination System (MPDES) with the Montana Water Quality Division for storm water associated with construction activities. All fees associated with this permit application and any subsequent annual fees will be paid for by Contractor.

2. The Contractor shall be required to comply with all requirements of the 2013 (or current) "General Permit for Strom Water Discharges Associated with Construction Activity" (General Permit). The Contractor shall create a Storm Water Pollution Prevention Plan (SWPPP), and update this plan as required during construction for mitigating erosion and sediment control. The Contractor is responsible for installing, maintaining and preserving all erosion control measures for the Project in conformance with the SWPPP and any Montana Department of Environmental Quality and EPA regulations related to storm water discharge. The Contractor shall be responsible for performing all Monitoring, Reporting, and Records Retention Requirements per Part III of the General Permit. The Contractor shall be responsible to make any necessary changes to the SWPPP to prevent damage as a result of storm water runoff from this site using Best Management Practices.

3. The Contractor must have a copy of the NOI Receipt Confirmation Letter from DEQ providing coverage to discharge storm water under the General Permit, a copy of the SWPPP, and copies of the Contractor's reporting documentation on site at all times during construction. The Contractor is solely responsible for any and all damages and/or fines that may result from runoff from this site during the duration of this contract. The Contractor shall provide all monitoring and reporting records to the Engineer. The Contractor shall submit all monitoring reports within 2 days after completion of the report. Additionally, Contractor shall keep a copy of their updated SWPPP map on site at all times, and this map shall show all current locations of BMP's on the project.

4. The Contractor shall be responsible to maintain all erosion control measures throughout the warranty period. Once final stabilization of the Project is complete, the Contractor shall be responsible to remove erosion control measures, such as silt fencing, that are no longer necessary to contain sediment. The Contractor shall notify the Fish,

Wildlife and Parks, prior to final acceptance or any specified warranty period, when such erosion control measures will be removed, and this work shall be considered an item covered by the Project warranty.

5. Any penalties due to non-compliance with the General Permit requirements shall be the responsibility of the Contractor.

6. The Contractor is responsible to submit Notice of Termination (NOT) form when the construction activity is complete and the site has achieved final stabilization.

7. The Contractor shall provide copies of all documentation related to storm water permitting efforts, to include copies of the NOI and SWPPP, the NOI Receipt Confirmation Letter, monitoring reports, NOT, and any related documents.

B. Contractor should note that the storm water discharge permit does not cover construction dewatering associated with trench excavation. Any permitting required to discharge construction dewatering shall be obtained by the Contractor. The Contractor may contact the Montana Department of Environmental Quality to obtain permit applications and associated fees for construction dewatering.

C. Contractor shall be responsible for all permits fees, including any fees associated with re-application or renewal.

1.3 QUALITY ASSURANCE

A. Requirements of regulatory agencies:

1. Comply with all applicable requirements of local, state, and federal agencies.

2. Comply with the State of Montana DEQ, Water Quality Act 75-5-318 MCA.

B. The temporary erosion control plan should consider staging of construction and should address movement of sedimentation fences as construction progresses, temporary seeding and use of mulch, netting, sod, etc.

1.4 SUBMITTALS

A. Submit copies of all documents required for permitting and authorizations as specified within this section or as required by all local, state and federal regulations.

B. Provide all written reports required by the permitting authority.

C. Comply with the submittal requirements of Section 01300.

PART 2: PRODUCTS

2.1 GENERAL

A. Products used for Erosion Control and Best Management Practices shall be in conformance with the details on the plans, and shall meet all local, state, and federal standards.

PART 3: EXECUTION

3.1 EROSION CONTROL MEASURES

A. The Contractor shall comply with all requirements of the SWPPP and General Permit. The Contractor shall monitor the site per the General Permit and make any changes to the SWPPP to add or amend the erosion control measures. All erosion control BMP's shall be in place prior to the start of construction disturbance in the effected area. The following general guidelines shall be used to control erosion:

1. Route existing surface runoff and underground drainage within the project area to sediment basins, and pipe the flow to the nearest catch basin before final discharge.

2. Divert surface waters that would otherwise enter the project area to prevent their contamination.

3. Minimize the area of unprotected soil.

4. Stabilize exposed soil as soon as practical.

5. Trap transported sediments before entering the state water bodies.

6. Incorporate permanent erosion control features as need to control sediment from leaving the site.

7. Reseed disturbed areas as soon as practical.

8. Inspect regularly especially after rainstorms per the monitoring requirements.

9. Repair or replace any damaged or missing items.

10. Minimize disturbance to any existing vegetation (grass and trees).

B. Contractor shall install BMP's as indicated within their SWPPP, and as called for on the erosion control plans. All BMP's, whether temporary or permanent, shall be included in the pay item for erosion control.

PART 4: MEASUREMENT AND PAYMENT

4.1 Payment associated with soil erosion and sediment control, to include all permitting, shall be included within the pay item “Erosion Control”, as listed on the Proposal. Payment shall include all costs associated with preparation and submittal of NOI and SWPPP to DEQ, all associated fees and costs associated with complying with all implementation and documentation under the MPDES General Permit. This item shall include all installation, maintenance, and removal (if required) of all sediment control structures and BMP’s, temporary and permanent, included in the SWPPP and on the plans, and necessary to comply with local, state, and federal standards. This work shall also include any work associated with monitoring and reporting for permit compliance.

END OF SECTION 02270

SECTION 02502
ASPHALT PRIME AND/OR TACK COAT (MPWSS, as amended)

PART 1: GENERAL

1.1 DESCRIPTION

Add the following:

"B. Tack coat shall be applied to all existing asphalt or concrete surfaces prior to asphalt installation. All surfaces shall be cleaned immediately prior to applying tack coat material. Clean the surface of all dust, dirt, sand or other objectionable material that prevents uniform coverage or bond between the tack material and the street surface, using a rotary power broom or blower, by hand sweeping, or both, as required. Do not mix material removed from the surface with the tack coat application."

PART 2: PRODUCTS

2.1 GENERAL

A. Use asphalt material as follows:

Type and Grade	Use
Emulsified Asphalt, SS-1 or SS-1h	Asphalt Tack Coat

PART 4: MEASUREMENT AND PAYMENT

Delete 4.1, 4.2, and 4.3 in their entirety and replace with the following:

"4.1 ASPHALT TACK COAT

A. No separate measurement or payment will be made for this item. Payment for this work will be subsidiary to other pay items."

END OF SECTION 02502

SECTION 02510
ASPHALT CONCRETE PAVEMENT (MPWSS, as amended)

PART 2: PRODUCTS

2.2 PLANT MIX AGGREGATES

Add the following sentence to the end of paragraph E.:

"The use of reclaimed asphalt pavement shall only be allowed with prior approval of the Engineer and Owner."

Add the following sentence to the end of paragraph I:

"The gradation for this Project will be Type B."

2.3 ASPHALT BINDER MATERIAL

Add the following sentence to the end of Paragraph A.:

"Use (PGAB) PG 58-28 or equivalent."

2.5 COMPOSITION OF MIXES

A. General

Add the following:

"5. Current job mix is defined as a mix design done within the last 12 months in which no change in material sources or amounts has been made."

PART 3: EXECUTION

3.16 SPREADING AND FINISHING

A. Spread and finish meeting the following requirements

Change "2-1/2 inches" to "3 inches".

3.29 PAVEMENT AND MATERIAL TESTING REQUIREMENTS

Add the following:

"G. The CONTRACTOR shall provide one asphalt core sample for every 400 linear feet of asphalt roadway, and every 10,000 square feet of parking lot area. The location of the core will be specified by the ENGINEER.

H. Pavement thickness will be a minimum as indicated on the plans, with a maximum tolerance of ¼-inch. The OWNER has the right to reject all pavement that does not meet the minimum thickness requirements, and these sections

shall be removed and replaced at no cost to the OWNER.

"PART 4: MEASUREMENT AND PAYMENT

4.1 TONNAGE BASIS - Delete

4.2 SQUARE YARD BASIS

A. Asphalt Concrete Pavement

Delete items 1. ,3., and 5. and replace with the following:

"1. 3" Thickness of Asphalt Concrete Pavement Surface Course, Grade "B"" shall be measured by the square foot of asphalt pavement surface area. The quantity listed in the Bid Form was computed from the plan lines and grades for the asphalt required to construct the roadway alignment and parking areas as shown on the plans. The square foot asphalt quantity listed in the Bid Form is final, and will not be adjusted unless a change is made to the plan line and grades approved by the ENGINEER. The asphalt speed tables shall be included within the square foot quantity for paving, and shall not be paid for separately.

Measurement for payment shall be based off the plan area and per the square foot quantity listed in the Proposal. Field measurements will not be performed. Payment shall be full compensation for producing, furnishing, transporting, stockpiling, heating, drying and screening of aggregate materials; for furnishing, handling, measuring, mixing, manipulating and placing of materials; for hauling, placing, shaping, compacting and finishing of the paving mix; for improving unsatisfactory areas; for furnishing samples; for all materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work in full compliance with the plans and specifications.

2. Asphalt patching associated with trench construction for sewer, water, electrical, and related items, shall not be paid for directly, and shall be considered incidental to the item of work for which it is associated."

END OF SECTION 02510

SECTION 02529
CONCRETE SIDEWALKS, DRIVEWAYS, APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISCELLANEOUS NEW CONCRETE CONSTRUCTION (*MPWSS as amended*)

PART 1: GENERAL

1.2 REFERENCES

Delete Paragraph A. in its entirety and replace with the following:

"A. Refer to applicable details on the plans."

Add the following section:

"1.3 CERTIFIED FLATWORK FINISHER

A. Contractors bidding on the project to have at least one (1) American Concrete Institute (ACI) Certified Flatwork Finisher available on-site at all times during placement and finishing of concrete."

PART 2: PRODUCTS

2.1 STRUCTURAL CONCRETE

Delete paragraph A. in its entirety and replace with the following:

"A. Furnish structural concrete meeting the requirements of Section 03310, STRUCTURAL CONCRETE. Concrete for use on this project shall be Portland cement with a minimum cement content of 564 lb/cy. No fly ash or slag will be accepted in the mix without written approval from the Engineer. All concrete shall be cured meeting the requirements below and Section 03310."

Delete Section 2.5 in its entirety and replace with the following:

"2.5 CURING AND PROTECTIVE COATING MATERIALS

"A. Curing Concrete: Contractor shall utilize a concrete curing compound on all concrete surfaces.

CURING COMPOUND: Clear spray Applied Membrane Forming Liquid conforming to ASTM C309-81, Type 1. Curing compound shall not reduce bonding or adhesion of finish materials applied to concrete surfaces.

1. Water-Based Acrylic Membrane Curing compound: ASTM C309, Type I, Class B.

a. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
b. Available Products: Subject to compliance with requirements, products that may be incorporated into the

work include, but are not limited to the following:
- Highseal, Conspec Marketing and Mfg. Co.
- Sealco – VOC, Cormix Construction Chemicals
- Safe Cure and Seal, Dayton Superior Corp.

2. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

   a. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
   - Aquafilm, Conspec Marketing and Mfg. Co.
   - Eucobar, Euclid Chemical Co.
   - E-Con, L&M Construction Chemicals, Inc."

PART 3: EXECUTION

3.2 FOUNDATION PREPARATION

B. Change "3 inches" to "4 inches minimum."

3.3 FORMS

Add the following paragraphs

"C. Contractors shall check with the Engineer prior to any pour for verification as to correctness of forms prior to any ordering of concrete.

D. The contractor shall verify that all sidewalk, laydowns, driveways, and miscellaneous concrete construction meet applicable Federal, State, and local ADA standards prior to pouring concrete."

PART 4: MEASUREMENT AND PAYMENT

Delete Paragraphs 4.1, 4.2, 4.3, 4.4, and 4.5 in their entirety and replace with the following:

"4.1 4" THICKNESS CONCRETE SIDEWALK

A. Concrete surfacing shall be measured and paid for per the square foot for the thickness and type indicated in the Proposal. Payment is full compensation for all material, excavation, foundation gravel materials, backfill, forming, curing of concrete, equipment, tools and labor, and for work and incidentals necessary to complete this item in place.

B. Unless specifically listed for payment within section 02235 Crushed Base Course, all foundation gravel for concrete shall be considered incidental to payment of the concrete listed in paragraph A. above."

END OF SECTION 02529

SECTION 02581
PAVEMENT MARKING AND MARKERS
(PRE-FORMED PLASTIC, PAINTS AND ENAMELS) (MPWSS, as amended)

PART 1: GENERAL

Delete paragraph 1.1 in its entirety and replace with the following:

"1.1 DESCRIPTION

A. This work includes painting pavement lines and symbols as described on the plans and within these specifications. All pavement markings shall be waterborne paint and shall meet the requirements herein, and in conformity with the lines and dimensions shown in the contract documents or established by the Owner or Engineer."

PART 3: EXECUTION

3.2 PAINTING TRAFFIC LINES

Delete paragraph C in its entirety and replace with the following:

"C. Before applying paint, Contractor shall be responsible for all layout of pavement markings using the dimensions indicated on the plans."

PART 4: MEASUREMENT AND PAYMENT

Delete Paragraph 4.1 in its entirety and replace with the following:

"4.1 PAVEMENT MARKING

A. All pavement markings shown on the plans and described within these specifications shall be waterborne paint. Include all costs associated with providing pavement markings in the lump sum price bid for "Pavement Markings" as listed on the Proposal. Price and payment is full compensation for the work, including all labor, materials, final striping layout, coordination with Engineer and equipment used in the work."

END OF SECTION 02581

SECTION 02585
STREET SIGNS (A*dded Section*)

PART 1: GENERAL

1.1 DESCRIPTION

A. This work involves providing new sign posts and sign mounting hardware, installation of posts per the details on the plans, and mounting of the sign faces.

B. All sign faces will be provided by FWP.

PART 2: PRODUCTS

2.1 STREET AND TRAFFIC CONTROL SIGNS

A. Provide sign post installation per the details and locations as indicated on the plans.

PART 3: EXECUTION

3.1 INSTALLATION

A. All traffic signs proposed for the project shall be installed per the details shown on the plans.

B. All traffic sign installations, to include final locations, must be approved by the Engineer prior to installation.

PART 4: MEASUREMENT AND PAYMENT

4.1 SIGNS

A. New sign installation shall be paid for per the each for “Street Sign Installation” as indicate in the Proposal. Measurement and payment shall include sign post, sign mounting hardware, foundation gravel, excavation, backfill and compaction, installation of sign face (provided by FWP) and all labor, materials, and incidentals to complete sign installation. Relocation of street signs, where indicated, shall be paid for as a new street sign installation.

END OF SECTION 02585

SECTION 02660
WATER DISTRIBUTION SYSTEM (*MPWSS as amended)*

PART 1: GENERAL

Delete Part 1 in its entirety and replace with the following:

"1.1 DESCRIPTION

A. Construct the water distribution system, to include water services, in conformance with the contract documents, "Montana Department of Environmental Quality Circular DEQ-3, Montana Standards for Small Water Systems", and as specified as follows. This section includes water-distribution piping and related components for domestic service. Furnish and install water lines, together with related appurtenances. Construct water services, including water service piping, curb stops and related items. Remove and/or abandon existing water distribution system mains, fittings, services, and other appurtenant items as noted on the plans. Furnish a manufacturer's certification covering all pipe and fittings furnished, certifying that the pipe and fittings meet applicable specifications. Provide submittals, to include product data and manufacturers certifications for all pipe, pipe fittings, valves, and hydrants."

PART 2: PRODUCTS

Delete Part 2 in its entirety and replace with the following:

"2.1 MATERIALS

A. Furnish water main pipe and fittings meeting the material and testing requirements of this Section. Furnish fittings and service line piping of the same material and design as the water main pipe unless specified otherwise. Pipe strength classifications are shown on plan drawings and/or are listed in the Contract Documents. References made to ASTM, ANSI, AWWA, USASI or AASHTO designations are the latest revision at the time of call for proposals. Assure all pipe is clearly marked showing type, class and/or thickness. Lettering must be legible and permanent under normal handling and storage conditions.

B. Polyethylene Pipe (HDPE) Pressure Pipe. Furnish HDPE water main pipe from ¾" to three (3) inches as indicated on the plans. Use pipe meeting AWWA Specification C901, "Polyethylene (PE) Pressure Pipe, Tubing and Fittings, 1/2 inch through 3 inch for Water" and ASTM PE3406-3408.

1. PE pipe to be (IPS) SIDR 7 for diameters of ¾ inch to 2 inch. Stainless steel inserts required on all compression type fittings for PE tube.

2. Install tracer wire on all PE pipe.

C. Curb Stops.

1. Provide curb stops that are Mueller 300 Ball Curb Valves with drain with Insta-Tite or 110 compression fittings. Stainless steel liners are required for 110 compression fittings on PE pipe.

D. Curb Boxes.

1. Provide extension type, stationary rod, Minneapolis pattern, 1.5" diameter Mueller H-10302 or approved equal. Extended lengths on all boxes must be a minimum of 78 inches. Stationary rods to be 63 inches standard.

E. Special Fittings.

1. Furnish special fittings meeting the Contract Documents. Special fittings shall be brass or stainless steel compatible with pipe size and type. Fittings shall be Mueller or approved equal. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

F. Tracer Wire. Install with all mains and services with 14 gauge (minimum) insulated solid core tracer wire for the non-metallic buried piping.

1. Tape tracer wire to the top of the water main. Bring up and tie off tracer wire at each valve body, curb stop and fire hydrant. Make breaks, splices or taps with waterproof, solderless and corrosion proof connectors rated for all underground direct bury applications.

2. All tracer wire shall be tested by the Contractor prior to final inspection. Contractor shall notify the Engineer 24 hours in advance of the testing.

G. Pipe Bedding Materials.

1. Pipe bedding shall conform to the thickness and widths as indicated in the plans and meeting the material and compaction requirements included within Section 02221.

I. Hydrant Assemblies

1. Furnish hydrant assemblies meeting the materials indicated on the detail on the plans. Submit all hydrant materials and fittings for approval prior to ordering materials."

PART 3: EXECUTION

Delete Part 3 in its entirety and replace with the following:

"3.1 Install pipe following the manufacturer's specifications and instructions. Provide all tools and equipment required to install each type of pipe used. Replace all defective material or material damaged by handling after delivery by the manufacturer. Include the furnishing of all materials and labor required to replace installed material discovered

damaged or defective before final acceptance of the work, or during warranty period. Store all material safely and to prevent damage. Keep pipe interior and other accessories free from dirt and foreign matter at all times. Deliver and distribute all Contractor furnished pipe at the site. Load and unload pipe, fittings, specials, valves and accessories to prevent damage. Do not handle pipe on skidways to skid or roll against pipe already on the ground. Repair or replace all damaged pipe at Contractor's expense on the jobsite.

3.2 LAYING OF PIPE

A. Inspect pipe and pipe coating for damage or defects prior to installation. Lay pipe without damaging the pipe coating. Repair all pipe coating damage following the manufacturer's instructions before laying the pipe. Lay pipe to the specified lines and grades with fittings and valves at the required locations. Plumb all valve stems. Carefully lower all pipe, fittings and valves into the trench to prevent damaging pipe materials or coatings. Do not allow foreign material to enter the pipe during installation. Close the open ends of the pipe using a watertight plug or other approved methods to prevent material entering the pipe when installation is not in progress.

3.3 PIPE JOINTING

A. Drawings indicate general arrangement of piping, fittings, and specialties. Piping installation requirements are to be completed per manufacturer’s recommendations. Do not exceed the applicable material and joint specifications of AWWA or the pipe manufacturer's recommendations at pipe joints for various types of pipe. Excavate trenches to accommodate deflections and curves.

3.4 PIPE CUTTING

A. Cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damaging the pipe or coating and leaving a smooth end at right angles to the pipe axis. Do not cut pipe using an oxyacetylene torch.

3.5 TESTING, CLEANING & DISINFECTING WATER PIPES, VALVES, AND FITTINGS

A. Disinfect the water mains subject to the Project Manager's approval in accordance with AWWA C651, "Disinfecting Water Mains", and these specifications, before placing the main in service. Keep the interior of all pipe, fittings and appurtenances free from dirt, heavy and foreign particles.

B. Forms of Chlorine

1. The forms of chlorine that may be used, subject to the approval of the Project Manager, are:

a. Liquid chlorine containing 100 percent available chlorine under pressure in steel containers. Meet AWWA B301 requirements and use only in combination with appropriate gas-flow chlorinators and ejectors.

b. Sodium hypochlorite in liquid form containing approximately 5 to 15 percent available chlorine. Meet AWWA B300 requirements.

c. Calcium hypochlorite in granular form or in 5g tablets containing approximately 65 percent available chlorine by weight. Meet AWWA B300 requirements.

C. Methods of Chlorination

1. Three (3) methods of chlorination may be used:

a. Tablet Method

1) This method gives an average chlorine dose of approximately 25 mg./L

2) This method may be used if the pipes and appurtenances are kept clean and dry during construction.

3) During construction, place calcium hypochlorite granules at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-foot (150 meter) intervals. Use the quantity of granules shown in Table 2.

4) Warning: Do not use this procedure on solvent welded plastic or on screwed joint steel pipe because of fire or explosion hazard from the reaction of the joint compounds with the calcium hypochlorite.

TABLE 2
OUNCES OF CALCIUM HYPOCHLORITE GRANULES TO BE PLACED AT BEGINNING OF MAIN AND AT EACH 500-FOOT (150 METER) INTERVAL

Pipe Diameter		Calcium Granules	
Inches	(cm)	oz.	grams
4	(10)	0.5	14
6	(15)	1.0	28
8	(20)	2.0	57
12	(30)	4.0	113
16 and	(41)	8.0	227

5) During construction, place 5g calcium hypochlorite tablets in each section of pipe and also place one tablet in each hydrant, hydrant branch and other appurtenance. Use the number of 5g tablets for each pipe section required to

provide a minimum chlorine concentration of 25 mg/L. Attach tablets to the inside of the pipe using an adhesive such as Permatex No. l or equal. Assure no adhesive is on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets at the inside top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, mark their position on the section so it can be readily determined that the pipe is installed with the tablets at the top.

6) When installation has been completed, fill the main with water at a velocity not exceeding 1 fps. Take precautions to assure that air pockets are eliminated. Leave this water in the pipe for at least 24 hours. If the water temperature is less than 41 ° F, leave the water in the pipe for at least 48 hours. Position valves so that the chlorine solution in the main being treated will not flow into water mains in active service.

b. Continuous Feed Method (preferred method)

1) This method gives a 24 hour chlorine residual of not less than 10 mg/L

2) Before chlorinating, fill the main with water to eliminate air pockets and flush as specified above.

3) Use water from the existing distribution system or other approved source of supply to flow at a constant, measured rate into the newly laid water main. At a point not more than 10 feet (3 meters) downstream from the beginning of the new main, assure water entering the new main receives chlorine fed at a minimum 25 mg/L free chlorine. To assure that this concentration is provided, measure the chlorine concentration at regular intervals.

4) If continuous feed method is proposed, coordinate the required amounts of chlorine compound required for various pipe sizes with the Project Manager.

5) During chlorine application, position valves so that the chlorine solution in the main being treated does not flow into water mains in active service. Do not stop chlorine application until the entire main is filled with chlorinated water. Retain the chlorinated water in the main for at least 24 hours, operating all valves and hydrants in the section treated to disinfect the appurtenances. At the end of the 24-hour period, the treated water in all portions of the main must have a minimum free chlorine residual of 10 mg/L free chlorine.

6) The preferred equipment for applying liquid chlorine is a solution feed vacuum operated chlorinator to mix the chlorine gas in solution water, in combination with a booster pump for injecting the chlorine gas solution water into the main to be disinfected. It is recommended that direct feed chlorinators not be used. Hypochlorite solutions may be applied to the water main with a chemical feed pump designed for feeding chlorine solutions.

7) If approved, an optional continuous feed method utilizing calcium hypochlorite granules may be used. Place the granules in the pipe sections as specified under the Tablet Method.

c. Slug Method (requires pre-approval by the Project Manager)

1) This method provides a three hour exposure of not less than 50 mg./L free chlorine.

2) Before chlorinating, preliminary flush the main as specified herein.

3) Use water from the existing distribution system or other approved source of supply to flow at a constant measured rate into the newly laid water main.

4) Not more than 10 feet (3 meters) downstream from the beginning of the new main, add chlorine to the water entering the new main at a constant rate that the water will have a minimum of 100 mg/L free chlorine. Measure this concentration at regular intervals. Apply the chlorine continuously and for the time required to develop a solid column or "slug" of chlorinated water that, as it moves through the main, exposes all interior surfaces to a 100 mg/L for at least 3 hours.

5) Measure the free chlorine residual in the slug as it moves through the main. If at any time it drops below 50 mg/L stop the flow and relocate the chlorination equipment at the head of the slug, and as flow is resumed, add chlorine to restore the free chlorine in the slug to not less than 100 mg/L.

6) As the chlorinated water flows past fittings and valves, operate related valves and hydrants to disinfect appurtenances and pipe branches.

D. Final Flushing (clearing the main of heavily chlorinated water)

1. After the applicable retention period, do not allow heavily chlorinated water to remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, flush the heavily chlorinated water from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.

2. Dechlorinate heavily chlorinated water when discharge is to waters of the State of Montana.

E. Swabbing. Where connections are made to existing piping and the connections are not disinfected along with the newly installed main, swab or spray the interior of all pipe and fittings used in making the connections with a 1 percent hypochlorite solution before installation.

F. Supply, at no additional cost to the Owner, all items used for testing purposes, including chlorination and the use of temporary blow-offs.

G. Hydrostatic and Leakage Testing.

1. Perform hydrostatic and leakage testing in accordance with ASTM F2164. Once the pipe is laid and backfilled, test per ASTM F2164 located in Attachment A to a hydrostatic pressure of at least 1.5 times the normal operating pressure at the test point or 1.25 times the normal operating pressure at the highest point along the test section.

2. Cleaning Water Mains.

a. Flush the mains thoroughly after the pressure and leakage test are completed.

b. It is understood that such flushing removes only the lighter solids and cannot be relied upon to remove heavy material allowed to get into the main during placement. Use a minimum flushing velocity in the main of 2.5 feet per second (0.7 meters/second). If no hydrant is installed at the end of the main, provide a tap, or temporary blowoff, of the size to produce a velocity in the main of at least 2.5 feet per second (0.7 meters/second).

H. Bacteriological Tests.

1. After final flushing and before the water main is placed in service, test a sample, or samples, collected from the main(s) for turbidity and organisms. Collect at least one sample from the new main and one from each branch.

2. Redisinfection. If the initial disinfection fails to produce approved bacteriological or turbidity samples, re-flush and resample the main. If check samples show bacterial contamination, re-chlorinate the main until approved results are obtained.

I. Water and Sewer Main Separation. Maintain horizontal and vertical separation between water mains and sewer mains in accordance with the Contract Documents.

3.6 CAP ENDS AND ABANDON PIPE

A. Cap ends of existing water main and services as indicated on the Plans. Remove existing materials such as hydrants and fittings as called for. Salvage any existing materials to Owner as may be indicated on the Plans.

B. Crushing the ends is an acceptable means of capping pipes composed of ductile materials.

C. Work associated with abandoning existing main shall not be paid for directly and shall be considered incidentals to construction."

PART 4: MEASUREMENT AND PAYMENT

Delete Part 4 in its entirety and replace with the following:

"4.1 GENERAL

A. The following items are pay items for the work covered under this section. Payment for these items is full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not.

B. Any trees that need to be removed for the work covered under this section shall be considered incidental and are not included in the "Stump/Root Ball Removal." Bid Item

C. Removal and replacement of existing asphalt, where required to complete the work covered under this section shall be considered incidental.

4.2 WATER PIPE

A. The measurement of water pipes (mains or services) is made per linear foot along the centerline of pipe through all valves, fittings and appurtenances (unless listed in the proposal as separate items). Payment for water pipe will be made at the contract unit price bid per linear foot of various sizes called for, which includes furnishing and installing pipe, furnishing and placing bedding, trench excavation and backfill per Section 02221, cleaning, testing and disinfecting the water pipe and all other work necessary or incidental for completion of the item.

B. All restoration associated with water pipe construction, to include asphalt patching matching the details on the plans, shall be included in the linear foot price for water pipe.

4.3 FITTINGS AND VALVES

A. Measurement of water main fittings and valves is by numerical count of the various types and sizes listed in the Contract Documents. Payment for fittings and valves is made at the contract unit price bid for each fitting, and includes furnishing and installing the fittings or valves as required, thrust blocking and any other work necessary or incidental for completion of the item. Valves or fittings not specifically called for payment as listed in the Proposal shall be considered incidental to the water pipe as listed in section 4.2.A.

4.4 HYDRANT ASSEMBLIES

A. Hydrant assemblies shall be measured and paid for per the each for the type of hydrant as listed in the Proposal. Payment for hydrant assemblies includes furnishing and installing all components and incidentals as detailed on the hydrant assembly details within the plans. Payment shall include all materials, including RCP pipe, hydrant assemblies, fittings, piping, drain rock and any other work necessary or incidental for completion of the item in place.

4.5 CONNECT TO EXISTING WATER LINE

A. Measurement and payment for this item will be per the each for the price listed in the proposal for “Connect to Existing Water Line”, and will be full compensation for all work associated with this connection, and shall include all labor, equipment, materials and incidentals including locating service, excavation, backfill, new fittings as required, coordination and shutdown of service as required, tie-in, restoration as required, and all incidentals above and beyond the payment for water service line.

4.6 WATER SYSTEM TESTING

A. Testing of the water system, to include pressure and bacteriological testing, and all items used for testing purposes including chlorination and de-chlorination, as required, and the use of temporary blow-offs and miscellaneous materials shall not be paid for directly, and shall be considered incidental to other items of work.

END OF SECTION 02660

02660 WATER DISTRIBUTION

ATTACHMENT A

ASTM F2164 - Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure

Designation: F2164 – 13

An American National Standard

Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure[1]

This standard is issued under the fixed designation F2164; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice provides information on apparatus, safety, pre-test preparation, and procedures for conducting field tests of polyethylene and crosslinked polyethylene pressure piping systems by filling with a liquid and applying pressure to determine if leaks exist in the system.

1.2 This practice does not address leak testing using a pressurized gas (pneumatic testing). For safety reasons, some manufacturers prohibit or restrict pneumatic pressure testing of their products. Failure during a pressure leak test can be explosive, violent, and dangerous, especially if a compressed gas is used. In a compressed gas test, both the pressure stress on the system and the energy used to compress the gas are released at a failure. Contact component manufacturers for information about testing with gas under pressure.

1.3 This practice does not apply to leak testing of non-pressure, gravity-flow, negative pressure (vacuum), or non-thermoplastic piping systems. For field-testing of plastic gravity flow sewer lines, see Test Method F1417.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Additional safety information is presented in Section 7 and throughout this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1600 Terminology for Abbreviated Terms Relating to Plastics

F412 Terminology Relating to Plastic Piping Systems

F1417 Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air

2.2 *Other Documents:*

PPI TR-4-PPI Listing of Hydrostatic Design Basis (HDB), Pressure Design Bases (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials[3]

3. Terminology

3.1 Abbreviations and terms are in accordance with Terminology D1600 and Terminology F412 unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *authority having jurisdiction, n*—the organization, office, or individual responsible for "approving" equipment and installation, or a procedure.

3.2.1.1 *Discussion*—The term "authority having jurisdiction" is used in this practice in a broad manner since jurisdictions and "approval" agencies vary, as do their responsibilities. Where public safety is concerned, the "authority having jurisdiction" may be a federal, state, local, or other regional department or individual such as a Fire Chief, Fire Marshall, chief of a fire prevention bureau, labor department, building official, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority

[1] This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.40 on Test Methods.

Current edition approved April 1, 2013. Published April 2013. Originally approved in 2007. Last previous edition approved in 2010 as F2164–10$^{\varepsilon 1}$. DOI: 10.1520/F2164-13.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Plastics Pipe Institute (PPI), 105 Decker Court, Suite 825, Irving, TX 75062, http://www.plasticpipe.org.

***A Summary of Changes section appears at the end of this standard**

having jurisdiction." In many circumstances, the property owner or his authorized engineer or agent assumes the role of the "authority having jurisdiction"; at government installations, the commanding officer or departmental official may be the "authority having jurisdiction."

3.2.2 *approved, vt*—acceptable to the authority having jurisdiction.

3.2.3 *pressure piping system, n*—a piping system where all components in the system are pressure rated and intended for conveying a fluid under continuous internal pressure. (See also Terminology F412, *pressure pipe* and *non-pressure pipe*.) To verify suitability for pressure service, consult the component manufacturer.

NOTE 1—PPI TR-4 provides information about stress ratings for some plastic materials and products.

3.2.4 *restraint, n*—temporary or permanent structural measures or devices which restrict, guide, prevent, or safely limit disjoining or movement of piping system components while the system is under pressure during testing or service conditions. Restraint may include backfill, anchors, thrust blocks, external clamps and tie rods (joint restraints), pipe guides, and so forth. Restraint means that if violent separation or failure occurs during the test, any movement of components or parts is sufficiently constrained such that damage or injury is prevented.

3.2.5 *system design pressure, n*—the limiting continuous internal pressure specified by the piping system designer. System design pressure may be less than the pressure ratings of components in the system. System design pressure may be limited by component pressure ratings, by code or application requirements, or by other restrictions.

3.2.6 *visible leakage, n*—the visible escape (drip, spray, stream, flow, and so forth.) of test liquid from the test section through components, joints, connections, appurtenances, and the like in the test section.

4. Summary of Practice

4.1 The section of the piping system to be tested is isolated from other parts of the system and restrained against movement to prevent catastrophic failure. Components that are not to be subjected to test pressure or could be damaged by test pressure are isolated or removed as necessary. Isolated components are vented to atmosphere. The test section is filled with the testing liquid, raised to the test pressure, and allowed to stabilize. The system is inspected or monitored for leakage, and then test pressure is relieved. If repairs or corrections are necessary, they are performed only when the test section is depressurized. If necessary, a retest is performed after a relaxation period. At the conclusion of an acceptable test, the test section may be placed in service. Purging and disposal of the test liquid from the test section may be necessary.

4.2 Acceptance is determined by the approval of the authority having jurisdiction.

4.3 The authority having jurisdiction may specify procedures or requirements for test liquid disposal or erosion control.

5. Significance and Use

5.1 If required by the authority having jurisdiction, hydrostatic pressure leak testing may be conducted to discover and correct leaks or faults in a newly constructed or modified polyethylene or crosslinked polyethylene pressure piping system before placing the system in service. Leakage or faults usually occur at connections, joints, and mechanical seals where sealing under pressure is required. (**Warning**—Safety is of paramount importance when conducting hydrostatic pressure leak tests because testing under pressure may cause sudden violent rupture or failure.)

5.2 This practice uses a pressurized liquid to test for leaks. It does not verify if a piping material or a piping system design is suitable for pressure service. The suitability of a piping system for pressure service and its pressure rating or operating pressure is determined solely by its design and its installed components.

5.3 Systems that are not suitable for pressure testing should not be pressure tested. Such systems may contain lower pressure rated or non-pressure rated components that cannot be isolated from test pressure, or temporary caps or closures may not be practical. In these systems, leak inspections should be conducted during and after installation. Inspections typically include visual examination of joint appearance, mechanical checks of bolt or joint tightness, and other relevant examinations. See also Test Method F1417.

5.4 *Leakage Allowance*—There is no leakage allowance for a section of heat-fusion joined polyethylene piping, because properly made heat fusion joints do not leak. See 7.6.1.

5.4.1 Other types of joints or connections in the system may have a leakage allowance. Contact the joint or connection manufacturer for information.

5.5 *Expansion Allowance*—When test pressure is applied, polyethylene or crosslinked polyethylene pipe will expand slightly due to elasticity and Poisson effects. To compensate for expansion, make-up water is added during the initial expansion phase. The amount of make-up water (expansion allowance) will vary because expansion is not linear. This procedure compensates for expansion with an initial expansion phase, followed by a test phase. In the test phase, expansion is suspended by slightly reducing test pressure. See 9.6.

5.6 *Poisson Effect*—When test pressure is applied to plastic piping systems that have fully restrained joints (joints such as heat fusion, electrofusion, bolted flanges, and so forth.), diametrical expansion of the pipe may reduce the overall length of the fully restrained section. Poisson-effect length reduction may affect or cause disjoining in other contiguous sections that have partially restrained or non-restrained joints, such as bell-and-spigot joints, when such joints are in-line with the test section. To prevent Poisson-effect disjoining, take measures such as the installation of external joint restraints (diametrical clamps and tie-rods) on in-line non-restrained joints, installing in-line thrust anchors at the ends of the fully restrained section, or isolating the fully restrained test section from piping with non-restrained or partially restrained joints.

NOTE 2—When a tensile stress is applied to a material, it will elongate

in the direction of the applied stress, and will decrease in dimension at right angles to the direction of the applied stress. The ratio of decrease to elongation is the Poisson ratio. Under test pressure, piping materials will expand slightly in diameter and contract in length slightly according to the Poisson ratio of the material.

6. Apparatus and Equipment for Hydrostatic Procedures

6.1 *General*—Components such as caps, valves, blind flanges, manual or automatic air release devices, vents, and other devices that are used to isolate the test section from other parts of the system, to purge air from the system, and to isolate components that are not to be subjected to test pressure are generally needed.

6.1.1 Test section isolation and closure components are to be rated for pressures equal to or greater than the test pressure applied to the test section.

6.1.2 Although section isolation and closure components may only be connected to the test section for the duration of the test, the joint between the test section and a closure or isolation component should be at least as strong as joints in the test section. Additional restraint may be required.

6.1.3 Air release devices should be located at all high points along the test section.

6.1.4 Excessively worn or deteriorated equipment is unsuitable and is not to be used.

6.2 *Test Liquid*—An adequate supply of a safe test liquid, such as water, is necessary. The test liquid should be of appropriate safety and quality so that the environment, system, test equipment, and disposal (if necessary) are not adversely affected.

6.2.1 Where an existing water supply is used to supply test water, protect the existing water supply from backflow contamination in accordance with local codes or as required by the authority having jurisdiction. Remove backflow protection and isolate the test section from the existing water supply before testing.

6.2.2 Excluding retesting (if necessary), the quantity of liquid needed to fill the internal volume of the pipe test section and accommodate test section expansion and possible leakage at non-fusion joints and seals is estimated using:

$$V_{gal} = 1.015 \times 0.04 \times (ID_{in.})^2 \times L_{ft} \quad (1)$$

$$V_{m^3} = 1.015 \times 0.785 \times 10^{-6} \times (ID_{mm})^2 \times L_m$$

where:

V_{gal} = pipe section volume, U.S. gal,
$ID_{in.}$ = pipe inside diameter, in.,
L_{ft} = test section length, ft,
V_{m^3} = pipe section volume, m^3,
ID_{mm} = pipe inside diameter, mm, and
L_m = test section length, m.

6.3 *Filling and Pressurizing Equipment*—Liquid filling and pressurizing equipment such as pumps, and pressure regulating devices will usually be necessary. Filling equipment should be capable of filling the test section in a reasonable time against any elevation head pressure that may be present. Pressurizing equipment should be able to maintain the necessary test pressure in the test section and provide sufficient quantities of make-up test liquid for the duration of the test. Pressure regulating equipment should be capable of maintaining test pressure for the duration of the test.

6.3.1 Filling equipment and pressurizing equipment do not need to be the same equipment.

6.4 *Pressure Monitoring*—Use at least one calibrated pressure gage or sensor accurate to within two percent (2 %) of full scale. It is preferred that the gage or sensor full scale value not be more than twice the test pressure, and that scale graduations be no greater than two percent (2 %) of the full scale value. Using a valved tee, a gage cock for bleeding, a pressure snubber, and a duplicate, back-up pressure gage are recommended. A continuous pressure-recording device may be required.

6.4.1 Locate the test pressure gage or sensor to monitor test pressure at the lowest point in the test section. Pressure may be monitored at other points in the test section as well.

NOTE 3—Test pressure is a combination of pump pressure and the height (head) of liquid in the pipeline. Therefore, test pressure is always monitored at the lowest elevation point in the section where pressure is highest. Test pressure will be lower at higher points in the section. If a minimum test pressure at higher elevations must also be met, select test sections so that the minimum test pressure is met at the higher elevation, but do not increase test pressure at the lowest point. Excessive test pressure can cause damage or pipeline failure.

6.5 Other equipment to connect the pump(s) to the test section and the test liquid supply, control the flow of test liquid, power the pump(s), connect the pressure gage(s) or sensor(s) to the test section, monitor pressure, and drain or purge the test liquid from the test section may also be necessary.

7. Specific Safety Precautions

7.1 This specific safety information is in addition to the safety information in other sections of this practice.

7.2 Always take precautions to eliminate hazards to persons near lines being tested. For the entire duration of the procedure, including filling, initial pressurization, time at test pressure, and depressurization, only persons conducting the test or inspecting the system being tested should be allowed near the section under test. These persons should be fully informed of the hazards of field pressure testing. All other persons should be kept a safe distance away.

7.3 The test section is to be supervised at all times during pressure testing.

7.4 Failure may result in sudden, violent, uncontrolled, and dangerous movement of system piping, or components, or parts of components.

7.5 *Restraint Against Movement*—Take measures to ensure that all parts of the section under test are restrained against movement if failure occurs. Such measures may include backfilling, anchoring, or other appropriate means.

7.5.1 *Partial Backfilling During Testing*—When underground connections, joints, and seals are to be exposed for observation during the test, use sufficient backfill material placed between the joints, and over the pipe to prevent movement, giving due consideration to restraining thrust forces. In particular, pipes connected to restrained joints that

derive their stability from the interaction of the pipe and soil are to be backfilled prior to testing.

7.6 Leakage usually occurs at a connection, joint, or seal in the system. Depending upon the type of connection, joint, or seal, leakage may be seepage, spray, or a stream of internal test liquid.

7.6.1 When properly made, heat fusion joints in polyethylene pipe are as strong as the pipe and do not leak. Leakage at a fusion joint indicates a faulty joint that may rupture completely at any time. If leakage is observed at a fusion joint, move away immediately, and depressurize the test section.

8. Pre-Test Preparation and Set-Up

8.1 *General:*

8.1.1 Before testing, heat fusion joints are to be completely cooled. Mechanical joints are to be completely assembled with all necessary seals and all fasteners installed and tightened.

8.1.2 Flushing, pigging, or other means of cleaning the system to remove dirt and debris that may damage valves, regulators, and so forth, may be required before testing.

8.1.3 Allow concrete supports and anchors in the test section to cure until they have developed sufficient strength to withstand test pressure thrust forces.

8.1.4 Restrain all parts of the test section against movement in the event of failure. Temporarily remove, restrain, or isolate expansion joints and expansion compensators before starting.

8.2 *Test Section*—Testing may be conducted on the entire system, or on sections of the system. Test section size is determined by the capacity of the filling and pressurizing equipment. It is necessary to fill, pressurize, and test the section within the allotted overall time for the test. Equipment that has inadequate capacity may not be able to complete the test within allowable testing time limits. If so, use higher capacity test equipment, or test a smaller (shorter) section of the system.

8.3 *Test Temperature*—Polyethylene and crosslinked polyethylene piping materials are typically pressure rated at 73°F (23°C). At higher temperatures, reduced pressure ratings and test pressures may be required. Contact pipe, fitting, or component manufacturers for assistance with elevated temperature pressure ratings.

8.4 *Maximum Test Pressure*—Maximum test pressure is designated by the authority having jurisdiction in accordance with 8.4.1-8.4.4.

8.4.1 The maximum test pressure for pressure-rated polyethylene or crosslinked polyethylene piping is not to exceed 1.5 × the system design pressure where lower pressure-rated components or devices are not present, or have been removed or isolated from the test section.

8.4.2 The maximum test pressure is not to exceed the pressure rating of the lowest pressure-rated component in the test section, where lower pressure-rated components or devices cannot be removed or isolated from the test section. Consult the component manufacturer for pressure ratings.

NOTE 4—Lower pressure-rated components or devices may include components or devices such as pipe or fittings made from other plastics or metals, or appurtenances such as valves, hydrants, regulators, pressure relief devices, or the like, or some types of mechanical connections such as lower pressure-rated compression couplings or flanges with lower pressure-rated back-up rings.

8.4.3 Do not use higher test pressure even though some components in the test section may have a higher pressure rating.

8.4.4 To determine the maximum test pressure at elevated temperature, apply an elevated temperature system design pressure reduction per 8.3.

8.5 *Test Duration*—Test duration is limited for safety reasons and to prevent damage to the system. Per 7.2 and 7.3, access to systems under test is controlled for the duration of the test.

8.5.1 When the maximum test pressure is between system design pressure and 1.5 × the system design pressure or at 1.5 × the system design pressure, total testing time including the time required to pressurize, stabilize, hold test pressure, and depressurize should not exceed 8 h.

8.5.1.1 If retesting is necessary, the test section should be depressurized for 8 h prior to retesting.

8.5.2 When the maximum test pressure is the system design pressure or less, the total test time including time required to pressurize, stabilize, hold test pressure, and depressurize should be limited to a practical time period. See 7.2 and 7.3. (A test time of about 72 h or less is suggested.)

8.5.3 Before pressure is applied, examine test equipment and all connections to and in the test section to ensure that all are in proper operating condition and tightly connected.

8.5.4 Before pressure is applied, isolated components or devices are to be vented to atmosphere.

8.5.5 Before pressure is applied, disconnect or isolate and vent all low pressure filling lines and other low pressure items.

9. Hydrostatic Test Procedure

9.1 Use appropriate apparatus per Section 6, and water or an appropriate test liquid per 6.2.

9.2 Observe all safety precautions and specific safety precautions per Section 7.

9.3 Prepare and set-up the test section for hydrostatic pressure leak testing per Section 8.

9.4 *Filling*—Fill the test section slowly. Purge all air. Take all appropriate precautions to ensure that no air is trapped in the test section. (**Warning**—Entrapped air can result in an explosive, violent, and dangerous catastrophic failure because both the pressure stress on piping and the energy used to compress the entrapped air are released.)

9.4.1 To allow air to escape from the test section, flow velocities during filling should not exceed the capacities of air release devices or other openings used to release entrapped air. To avoid or limit transient pressure surges, the filling flow velocity should not exceed the design velocity of the piping system.

9.5 *Temperature Equalization*—Allow the test section and the test liquid to equalize to a common temperature.

9.6 *Pressurizing—Initial Expansion Phase*—When the test section is completely filled and purged of air, gradually increase pressure in the test section to the required test pressure.

9.6.1 If the test pressure cannot be attained, or if it takes an unreasonably long time to reach test pressure, there may be faults such as excessive leakage, entrapped air, or open valving, or the pressurizing equipment may be inadequate for the size of the test section. If such faults exist, discontinue pressurizing, and correct them before continuing.

9.6.2 Add make-up water as necessary to maintain maximum test pressure for 4 h.

9.7 *Test Phase*—Reduce test pressure by 10 psi (69.0 kPa) and monitor pressure for 1 h. Do not increase pressure or add make-up water.

9.8 *Pass/Fail Criteria*—If no visual leakage is observed, and pressure during the test phase remains steady (within 5 % of the test phase pressure) for the 1 h test phase period, a passing test is indicated.

9.9 *Retesting*—If retesting is necessary, depressurize the test section per 9.10 and correct any faults or leaks in the test section. Do not attempt to correct faults or fix leaks while the test section is under pressure.

9.9.1 When maximum test pressure is between system design pressure and 1.5 × system design pressure or at 1.5 × the system design pressure, allow the test section to "relax" for at least 8 h before re-pressurizing. After the relaxation period, repeat the initial expansion and test phases per 9.6 and 9.7.

9.10 *Depressurization*—Depressurize the test section by reducing pressure or releasing test liquid at a controlled rate. Sudden depressurization can cause water hammer.

9.11 *After the Test*—Remove temporary closure and isolation devices from the test section. Depending upon the application, flushing, disinfecting, or draining may be necessary. Regulations and codes may restrict or require specific procedures for some post-test procedures such as test liquid draining and disposal.

10. Test Records

10.1 Information about the leak test may need to be recorded if required by the authority having jurisdiction. Documentation may include the following information:

10.1.1 The test liquid.

10.1.1.1 Backflow prevention devices, if used.

10.1.2 The weather conditions and ambient temperature at the site during the test.

10.1.3 The test pressure.

10.1.3.1 The type of test gages in the test section.

10.1.3.2 The placement of test gages in the test section, such as test gage location distances and elevations from the beginning of the section.

10.1.3.3 Test gage calibration records.

10.1.3.4 Test pressures recorded during the test.

10.1.3.5 Any adjustments made to test pressure for elevated temperature.

10.1.4 The test duration.

10.1.5 A description of the test section length, elevations, and site location.

10.1.6 A description of the test section components.

10.1.7 Description of any leaks or failures and the corrective actions taken.

10.1.8 The date and time of day of the test.

10.1.9 The identification of the party conducting the test.

11. Keywords

11.1 crosslinked polyethylene; field leak test; hydrostatic leak test; leak test; polyethylene pipe

SUMMARY OF CHANGES

Committee F17 has identified the location of selected changes to this standard since the last issue (F2164–10$^{\varepsilon 1}$) that may impact the use of this standard.

(1) Title was revised.
(2) 1.1 was revised.
(3) 5.1 was revised.
(4) 5.5 was revised.
(5) 8.3 was revised.
(6) 8.4.1 was revised.
(7) Section 11 was revised.

SECTION 02730
SANITARY SEWER COLLECTION SYSTEMS (*MPWSS, as amended*)

PART 1: GENERAL

1.4 STANDARD DRAWINGS

A. Delete all Standard Drawings except Nos. 02720-7, and 02730-1. Add the following:

"Sanitary Sewer Details and shown on the Drawings."

PART 2: PRODUCTS

2.2 PIPE MATERIALS

A. Polyvinyl Chloride (PVC) Pipe

2. Gravity Sewer Pipe

Delete paragraph a. in its entirety and replace with the following:

“a. Furnish gravity sewer service pipe and fittings shall be ASTM D 1785 (PVC) Schedule 40. Pipe shall conform to ASTM D2665-82 and D3311-71 standards in accordance with UPC. Fittings shall conform to ASTM D2665-78 and D3311-79a and shall be glue fitting only. Solvent cement and primer shall conform to ASTM D2564-86.”

PART 3: EXECUTION

3.1 PIPE AND SERVICE LINE INSTALLATION:

Delete Paragraph E. in its entirety and replace with the following:

“E. Tolerances

1. Variance from established line and grade shall not be greater than 1/4”, provided that such variation does not result in a level or reverse sloping invert.”

Add the following paragraph:

“3.6 PLUG AND ABANDON PIPE

A. Cap ends of existing sewer main and services as indicated on the Plans or where existing sewer will be abandoned. Work associated with abandoning existing main shall not be paid for directly and shall be considered incidentals to construction.”

PART 4: MEASUREMENT AND PAYMENT

Delete Section 4.1 – 4.5 in their entirety and replace with the following:

"4.1 GENERAL

A. The following items are pay items for the work covered under this section. Payment for these items is full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not.

B. Any trees or vegetation that need to be removed for the work covered under this section shall be considered incidental and are not included in the "Stump/Root Ball Removal." Bid Item

C. Removal and replacement of existing asphalt, where required to complete the work covered under this section shall be considered incidental.

4.2 SEWER SERIVE

A. The measurement of sewer service is made per linear foot along the centerline of pipe through all bends, fittings and appurtenances (unless listed in the proposal as separate items). Payment for sewer service shall be made at the contract unit price bid per linear foot of sizes called for in the Proposal, which includes furnishing and installing pipe, furnishing and placing bedding, trench excavation and backfill per Section 02221, and all other work necessary or incidental for completion of the item.

B. All restoration associated with sewer service and related sewer installation, to include asphalt patching matching the details on the plans, shall be included in the linear foot price for sewer service.

4.3 CONNECT TO EXISTING SEPTIC TANK

A. Connection to existing septic tank will be paid for per the Lump Sum as listed in the Proposal. Measurement and Payment shall be full compensation for all costs associated with making the connection, sealing any penetrations as needed, all pipe and fittings to make the connection, and any incidentals to connect to the existing septic tank per the drawings and specifications.

4.4 CLEANOUTS AND RV CONNECTIONS

A. Cleanout and RV connections shall be constructed as indicated on the plan details. These items shall be paid for by the each as indicated on the Proposal. Payment shall include all labor, equipment, materials, and incidentals to complete the item in place."

END OF SECTION 02730

SECTION 02735
VAULT TOILET SITE PREP (*Added Section*)

PART 1: GENERAL

1.1 DESCRIPTION

A. This item shall include the site preparation and finish work associated with the installation of 3 vault toilets as indicated on the plans.

B. Vault toilets shall be supplied by Owner. Contractor shall coordinate all site delivery with Jon Maxwell of FWP. Vault toilets shall be delivered and set by Missoula Concrete.

1.2 PRODUCTS

A. Vault toilet shall be the "Aspen Vault Toilet" as manufactured by Missoula Concrete Construction. Vault toilet specifications are included within Attachment A for Contractor's reference.

PART 2: PRODUCTS

1.1 GENERAL

A. Products used for vault toilet site preparation and finish shall be as indicated in the details on the plans.

PART 3: EXECUTION

1.1 GENERAL

A. Vault toilet site preparation shall be performed to meet the details on the plans, and in conformance with section 8.0 (Installation) of Attachment A. Excavation shall meet the width, depth, and elevations as indicated on the plan details. Compact foundation gravels to 98% maximum dry density per AASHTO T99. Backfill and compact vault in minimum 8" lifts, meeting 95% maximum dry density per AASHTO T99. Complete all restoration items to finish grade, ensuring positive drainage away from structure. Coordinate all electrical components for toilet installation (see electrical plans). Complete all restoration, to include any seeding and path construction to new toilet as indicated on the plans.

PART 4: MEASUREMENT AND PAYMENT

4.1 VAULT TOILETS

A. Measurement for payment for "Vault Toilet Site Prep" as listed in the proposal shall be per the each as listed in the Proposal. Payment shall include all work associated with site excavation, foundation materials and preparation, coordination of vault installation, backfill and compaction, site restoration,

electrical coordination, and all labor, equipment, materials, and incidentals to complete item in place.

END OF SECTION 02735

02735 VAULT TOILET

ATTACHMENT A

ASPEN VAULT TOILET SPECIFICATIONS

Missoula Concrete Construction

pci CERTIFIED PLANT

www.missoulaconcrete.com

Phone (406) 549-9682 FAX (406) 549-6404

P.O. Box 16086 Missoula, MT 59808-6086

Aspen Vault Toilet Specifications

Missoula Concrete Construction

Missoula Montana

Specifications for Aspen Style Vault Toilet Buildings

1.0 SCOPE

This specification covers the construction and placing of the Aspen Style precast concrete vault toilet building as produced by Missoula Concrete Construction.

2.0 SPECIFICATIONS

ASTM C33	Concrete Aggregates
ASTM C39	Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C143	Method of Test for Slump of Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C192	Method of Making and Curing Test Specimens in the Laboratory
ACI 1211.1	Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete
PCI MNL 116	Quality Control for Plants and Production of Precast Prestressed Concrete Products
AWS D1.1	Structural Welding Code

3.0 DESIGN CRITERIA

The Aspen has been designed to meet the following criteria. Calculations and Engineer's stamped drawings are available upon request by the customer and are for their sole and specific use only. The design criteria are to ensure that the Aspen not only will withstand the forces of nature listed below but to provide protection from vandalism and other unforeseen hazards.

A. Snow Load

The Aspen will withstand a snow load of 250 pounds per square foot.

B. Wind Load

The Aspen will withstand the effects of 120 mile per hour wind load (fastest mile) or 180 mph (3 second-gust) Exposure C.

C. Earth Quake

The Aspen will withstand the effects of a zone 4 earthquake.

D. Additional Design Standards

1. The Aspen is designed to meet the requirements of the Americans with Disabilities Act Requirements and Uniform Federal Accessibility Standard including as of the date of these specifications.

2. The Aspen incorporates all design aspects of Sweet Smelling Technology as outlined by Brian Cook for the U.S. Forest Service. ("In Depth Design and Maintenance Manual for Vault Toilets" - July 1991 - Publication No. 9123 1601)

3. The Aspen has a one-piece vault unit to support the building, screen area and snow loads evenly. The Aspen has a one piece prestressed floor unit with a 250 psf load capacity to withstand transportation stresses.

E. Tolerances

Tolerances will be within the limits as dictated by the PCI Quality Control and Assurance Manual.

4.0 MATERIALS

A. Concrete - General

This concrete mix design is designed to ACI 211.1 to produce concrete of good workability.

Mix #7.25 R - 1 cubic yard
cement 681 lbs.
water 232 lbs. (27.8 gal.)
w/c=.34
Course aggregate (SSD) 1,800 lbs.
Fine aggregate (SSD) 1,196 lbs.
Water Reducing Agent 34 oz. MB 322N
Air Entraining Agent 6 oz. MB AE-90 (4-7%)
Ave. 28 day strength 5,500 psi

1. Cement will be low alkali type I-II or type III conforming to ASTM C-150
2. Coarse aggregates used in the concrete mix design will conform to ASTM C33 with the designated size of coarse aggregate #67.
3. Minimum water/cement ratio will not exceed 0.40. Slump will not exceed 5" with normal water reducing agent or 7" with super plasticizer.
4. Air-entrained admixtures will conform to ASTM C260. Water reducing admixtures will conform to ASTM C494, Type A. Plasticizing admixtures will conform to ASTMC 1017. Other admixtures will not be used without customer approval.

B. Colored Concrete

1. Color additives will conform to ASTM C979. A 6"x12"x2" color sample will be available for customer approval.
2. The following will contain colored concrete:
   a. Toilet building roof panels
   b. Building walls
   c. Screen panels
   d. The sample brand and type of color additive will be used throughout the manufacturing process.
   e. All ingredients will be weighed and the mixing operation will be adequate to ensure uniform dispersion of the color.
3. Color pigments will be by Davis Colors.

C. Cold Weather Concrete

1. Cold weather concrete placement will be in accordance with ACI 306.
2. Concrete will not be placed if ambient temperature is expected to be below 35 degrees F. during the curing period unless heat is readily available to maintain the surface temperature of the concrete at least 45 degrees F.
3. Materials containing frost or lumps of frozen materials will not be used.

D. Hot Weather Concrete

The Temperature of the concrete will not exceed 80 degrees F. at the time of placement and when the ambient temperature reaches 90 degrees F. The concrete will be protected with moist covering.

E. Concrete Reinforcement

1. All reinforcing steel will conform to ASTM A615. All welded wire fabric will conform to ASTM A185.
2. All reinforcement will be new, free of dirt oil. Paint, grease, and loose mill scale and loose or thick rust when placed.
3. Details not shown on drawings or specified will be to ACI 318.
4. Steel reinforcement will be centered in the cross-sectional area of the walls and will have at least 1" of cover on the under surface of the floor and roof.
5. The maximum allowable variation for center-center spacing of reinforcing steel will be 1/2".
6. Full lengths of reinforcing steel will be used when possible.
7. Reinforcing bars will be bent cold.
8. Diagonal reinforcement will be placed around all openings.

F. Sealers and Curing Compounds

1. Curing compounds, if used, will be odorless, complying with ASTM C309 type I or I-D.
2. Weatherproofing sealer for exterior of building will be clear, low gloss, water based acrylic sealer (Dayton-Superior J-24).

G. Caulking, Grout, Adhesive and Sealer

1. All caulking will remain flexible and non-sag at temperatures from 50 to 140 degrees Fahrenheit>
2. Interior joints will be caulked with white “Sidewinder” by DAP.
3. Exterior joints will be caulked with a siliconized acrylic caulk that closely matches the exterior concrete color (by GE Sealants). Roof ridge will be 100% silicon caulk (also by GE Sealants).
4. Epoxy concrete adhesive will be two component rigid, non sag gel adhesive for bonding to dry or damp surfaces, moisture insensitive.
5. Portland cement mortar will consist of one part Portland cement, three parts sand and enough water to make a workable mixture

H. Paint

1. All paints and materials will conform to all Federal specifications or be similar "top-of-the-line-components". Paints will be lead free.
   a. Inside concrete surfaces:
      I. Interior Floors will be Rust-Oleum, High Performance 5300 system 2 part, water-based epoxy, Color: Gray (www.roddapaint.com)
      II. Interior walls and ceiling will be Rodda Master Painter, White Base 54 3101 5, Interior semi-gloss, Color: White. (www.roddapaint.com)
   b. Metal surfaces both inside and out:
      I. Rodda Industrial Protective Coatings, Professional Maintenance, Neutral Base 75 8104 1, all purpose gloss equipment enamel, Color: Varies (Normally custom matched to Rust-Oleum 7754 Anodized Bronze) (www.roddapaint.com)
   c. Exterior concrete surfaces:
      I. Exterior slab will be clear sealer.
      II. Exterior walls will be Rodda AC-Exterior Series, Neutral Base 51 1104 5, 911 Velvet Flat Latex Color: Varies. (www.roddapaint.com)
      III. Simulated shake roof will be boiled linseed oil thinned 10% with paint thinner.

I. Grab bars

Grab bars will be 18 gauge, type 304 stainless steel with 1-1/2" clearance. Grab bars will each be able to withstand 300 pounds of loading.

J. Toilet Paper Dispenser

Dispenser will be constructed of 1/4" thick steel with an enamel finish. Dispenser will be capable of holding three (3) standard rolls of toilet paper. Toilet paper holder fastening system will be able to withstand 300 pound top loading.

K. Toilet Riser

Toilet riser will be 18" high, white cross linked polyethyene, with heavy duty seat and lid, manufactured by Romtec, Roseburg, OR.

L. Steel Doors

1. Doors will be flush panel type 1-3/4" thick, minimum 16 gauge prime coated steel panels, level 3 Extra Heavy-duty, by Ceco Door Products.
2. Door frames will be knockdown or welded type, single rabbet, minimum 16 gauge prime coated steel width to suit wall thickness. Three (3) rubber door silencers will be provided on latch side of frame.

M. Door Hinges

Door hinges will be 3 per door with dull chrome plating 4 1/2"x 4 1/2", adjustable tension automatic-closing for each door.

N. Lockset

1. Lockset will meet ANSI AI 56.2 Series 4000, Grade 1 cylindrical lockset for exterior doors.

2. Lever handle both inside and out.
3. Either handle operates latch unless outside handle is locked by inside push-button.
4. Push-button will automatically release when inside lever handle is turned or door is closed.
5. Emergency slot on exterior so door can be unlocked from the outside with a coin, screwdriver, and etc.
6. Inside lever always active.
7. U.S. 26D finish.

O. Door or Wall Louvers

Door louver will be fixed, inverted split Y, non-vision, 18 gauge cold rolled steel with a factory prime coat equal to FDLS series.

Wall louver (if requested) will be HEAVY DUTY KICK PROOF VENT by Romtec, Roseburg, OR.

P. Doorstop

Door stop will have a cast metal base, U.S. 26D finish with gray rubber 2-3/8" diameter bumper with a 1" projection.

Q. Double Coat Hook

Coat hooks will be constructed of solid brass with a brushed chrome finish. Hooks will be side by side “ram horn” style with minimal projection for safety.

R. Door Sweep

Door sweep will be provided at the bottom of door and will be an adjustable brush type.

S. Windows and Vault Cleanout Cover

1. Windows and cleanout cover frames will be constructed from steel.
2. Window glazing will be 1/4" thick LEXAN polycarbonate.
3. Plate for vault cleanout cover will be 1/4" thick diamond plate steel. Lid will be configured so that it can be locked with a padlock. Lid will be designed to resist surface runoff penetration into the vault. A neoprene gasket will be provided around the entire perimeter of the lid to provide an airtight seal.

T. Vault Liner

The vault shall include a one-piece 0.187" thick LDPE plastic liner by RMI Manufacturing, Caldwell, ID. Vaults with the LDPE liner shall be warranted against leaks for a period of 7 years.

5.0 MANUFACTURE

A. Mixing and Delivery of Concrete.

Mixing and delivery of concrete will be in accordance with ASTM C94, section 10.6 through 10.9 with the following additions.

1. Aggregate and water will be adjusted to compensate for differences in the saturated surface-dry conditions.
2. Concrete will be discharged as soon as possible after mixing is complete. This time will not exceed 30 minutes.

B. Placing and Consolidating Concrete

Concrete will be consolidated by the use of mechanical vibrators. Vibrations will be sufficient to accomplish compaction but not to the point that segregation occurs.

C. Finishing Concrete

1. Interior floor and exterior slabs will be floated and troweled until all marks are removed. A light broom finish will be applied to the exterior and interior slabs for a non-slip finish.
2. All exterior building walls and exterior screen walls will be a barnwood texture, unless otherwise specified.
3. All exterior surfaces of the roof panels will be cast to simulate a cedar shake roof, unless otherwise specified. The underside of the overhang will have a smooth finish.

D. Cracks and Patching

1. Cracks in concrete components that are judged to affect the structural integrity of the building will be rejected.
2. Small holes, depressions and rock pockets will be patched with a suitable material. The patch will match the color, finish and texture of the surrounding surface.
3. Patching will not be allowed on defective areas if the structural integrity of building is affected.

E. Curing and Hardening Concrete

1. Concrete surfaces will not be allowed to dry out from exposure to hot, dry weather during the initial curing period.
2. Curing compounds will not be used on interior walls as they will prevent paint adhesion.

6. FINISHING AND FABRICATION

A. Structural Joints

1. All welding will be by Certified Welders only (in accordance with AWS D1.1).
2. Wall components will be joined together with 2 welded plate pairs at each joint. Weld plates will be anchored into the concrete panels and welded together with a continuous weld.
3. Walls and roof will be joined with weld plates, 2-1/2"x5", at each building corner.
4. The joint between the floor slab and walls will be joined with a grout mixture on the inside. a matching colored caulk on the outside and two weld plates 6" long per wall.

B. Painting

1. An appropriate curing time will be allowed before paint is applied to concrete.
2. Some applications may require acid etching. A 30% solution of hydrochloric acid will be used, flushed with water and allowed to thoroughly air dry.
3. Painting will not be done outside in cold, frosty or damp weather.
4. Painting will not be done outside in winter unless the temperature is 50 degrees Fahrenheit or higher.
5. Painting will not be done in dusty areas.
6. Schedule of finishes:
   a. Inside concrete surfaces
      I. Inside floors will be 2 coats of 2-part water based epoxy.
      II. Interior walls and ceiling will be one coat primer / filler and 2 coats of white water based acrylic emulsion.
   b. Metal surfaces both inside and out
      I. 1 coat primer and 2 coats of enamel

c. Exterior concrete surfaces
   I. Exterior slab will be 1 coat of clear sealer.
   II. Stained enhanced exterior walls will be 1 coat of pure acrylic water repellent penetration stain in the same color as the walls or roof followed by 1 coat of clear acrylic sealer.

7.0 QUALITY CONTROL AND INSPECTION

A. Pre-pour inspection.

1. Check all panel measurements including diagonals (must be within ¼ inch).
2. Check rebar spacing and clearance
3. Check location of all embeds.

B. Concrete Testing

1. The following tests will be performed on concrete used in the manufacture of toilets. Testing will only be performed by qualified individuals who have been certified ACI Technician Grade 1. Sampling will be in accordance with ASTM C172.
   a. The slump of the concrete will be performed on the first batch of concrete in accordance with ASTM C143. This slump will be in the 3"-5" range.
   b. The air content of the concrete will be checked per ASTM C231 on the first batch of concrete. The air content will be in the range of 4%-6%.
   c. The compressive strength of the cylinders will be tested to ASTM C39.
   d. Test cylinders will be taken from each other batch.
      - 1 cylinder will be tested prior to removal of forms and must be at 2,500 psi or higher.
      - 1 cylinder represents 7 day strength
      - 2 cylinders will represent 28 day strength and must be 4,500 psi or greater.

C. After Form Removal Inspection

1. Recheck panel dimensions
2. Verify that all embeds remained in place.
3. Look for all cracks or blemishes that may cause rejection.
4. Assure that panels are properly yarded and blocked.

8.0 INSTALLATION

A. Scope of Work

1. Work specified under this Section includes excavation, backfill and placement of precast concrete vault toilet.

B. Materials

1. Bedding material to be sand or 3/8" minus crushed or screened aggregate.
2. Sealant between vault and toilet floor to be 1"x1" Butyl Rubber Sealant.

C. Location and Access to the Site

It is the responsibility of the customer to locate the vault toilet in area that provides safe and reasonable access for trucks and equipment.

1. The area must be free of overhead or underground obstructions.
2. Care must be taken to not place excavated material in the area where the crane must sit.
3. Verify that bridges/culverts enroute to the site are rated for HS-20 loading.
4. Deliveries may be delayed if road conditions are hazardous or unsuitable for normal trucks and trailers.
5. Trucks must be able to reach the site under their own power.

D. Excavation and Elevation

1. Comply with all applicable OSHA Standards for excavation.
2. The "Aspen" vault toilet requires a hole that is 8ft wide and 16ft long as long as measured at the bottom. Depth should be 4'-9" below desired finished floor elevation.
3. Finish floor elevation will be 4-6 inches above natural grade measured at the front (entrance) of the exterior slab unless otherwise approved by the customer. The customer may specify a finish floor elevation for buildings at some sites. The contractor will install buildings at these sites with the floor elevation within ±0.05 feet of the specified floor elevation. It is very important that the installation provides drainage away from the structure.

F. Bedding and Compaction

1. Compact the natural ground at the bottom of the vault excavation with a minimum of three passes with a whacker-type mechanical compactor or equivalent approved by the customer.
2. Install sand or aggregate bedding material for leveling course. Compact leveling course with one pass with a whacker-type mechanical tamper or equivalent approved by the customer. Grade leveling course so there will be no high spots in the middle of the vault bottom. Compact with a second pass with a whacker or approved equivalent tamper.
3. Set vault in place. Backfill around structure. Use excavation material for backfill except that rocks larger than six inches in maximum dimensions shall not be placed within six inches of the exterior vault walls.

4. Fill, adjacent to the building entry, will have excavated material placed in eight inch loose lifts and compacted with a minimum of two passes with a whacker-type mechanical compactor or equivalent approved by the customer.

G. Finish Grading

1. Spread excess excavated material from the vault around structure. Intended final grade is flush with the top of the front slab. Allow for placement of topsoil to reach that grade. Grade backfill away from structure from structure at maximum slope of five (5) percent unless otherwise approved by the customer.
2. Spread stockpiled topsoil as final layer after rough grading is completed. Areas disturbed by excavation, backfilling and stockpiling of excavated materials will be handed raked to remove exposed rocks over one inch in maximum dimension. Oversized rocks removed from the surface shall be disposed of in a designated area within 200 feet of the site.

H. Vault Toilet Riser and Accessories

1. Apply Butyl rubber adhesive sealant to the top surface of the concrete vault before placing the structure on the vault.

I. Exhaust Pipe Installation

1. After exhaust pipe is installed, seal around pipe at top and underside of roof with silicone caulk. Seal around pipe at top of slab will be accomplished by using silicone caulk.

9.0 MISSOULA CONCRETE CONSTRUCTION WARRANTY

Missoula Concrete Construction warrants that all goods sold are manufactured with the best of industry standards and that all materials and workmanships are as set forth in the specifications.

For a period of 3 years from the date of delivery, Missoula Concrete Construction will repair or replace, free of charge, any of its structures which are determined to be structurally unsound due to poor workmanship or materials. Determination must be in writing by a licenced structural engineer. Missoula Concrete Construction must be given the opportunity to inspect the site.

For a period of 7 years from the date of delivery, Missoula Concrete Construction will replace, free of charge, any LPDE vault liner which allows the migration of liquid contents from the vault to the surrounding soil due to defects in manufacturing.

Accessories are warranted to the extent of the individual accessory manufacturer's warranty.

This warranty shall not apply to:

1. goods which have been improperly handled or improperly installed by others;
2. goods which have been poorly sited (Such as in areas subject to flooding or high water tables.)
3. goods which have been repaired or altered without Missoula Concrete Construction's written consent;
4. goods which have been damaged by forces of nature in excess of design criteria, to include fire, flood, avalanche, landslide, tornado, etc.
5. minor hairline cracks due to shrinkage, thermal expansion / contraction, or shipping.
6. damage due to accidents, vandalism, or improper maintenance.

10.0 DISCLAIMER OF OTHER WARRANTIES

THE WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ALL OTHER WARRANTIES ARE HEREBY DISCLAIMED. MISSOULA CONCRETE CONSTRUCTION MAKES NO OTHER WARRANTY OF MERCHANTABILITY OF OR FITNESS FOR A PARTICULAR PURPOSE OR USE.

11.0 LIMITATION OF REMEDIES

In the event of any breach of any obligation hereunder; breach of any warranty regarding the goods or any negligent act or omission of any party, the parties shall otherwise have all rights and remedies available at law; however, in no event shall Missoula Concrete Construction be subject to or liable for any incidental or consequential damages.

_____

Douglas G. Bauer, President

SECTION 02905
TREE PROTECTION (*ADDED SECTION)*

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Furnishing all supervision, labor and materials to protect existing trees to remain on site from any and all damage to above ground and below ground portions of the trees resulting from the Contractor's or his Subcontractor's work on site.

B. It is the Contractor's option to provide a construction fence barricade and/or Trunk Protection to protect trees during construction operations.

1.2 DEFINITIONS

A. Damaged Tree: Tree impacted by construction activities in a manner that causes physical harm that may lead to disease or death, such as bark penetration and branch breaking/tearing, burning, lack of water, compaction or chemical impacts to root zone and/or that causes aesthetic or structural balance disruption through scarring, discoloring, removal of canopy branches or leaning tree.

PART 2: PRODUCTS

2.1 TRUNK PROTECTION

A. Lumber: Use clean, recycled or new wood, (2 x 6) by 8'-0" length.

B. Fasteners: Use heavy gauge, smooth metal fencing wire and metal staples.

PART 3: EXECUTION

3.1 TRUNK PROTECTION

A. Where it is determined by the Contractor to provide truck protection, it should be installed prior to commencing construction. the following method is recommended:

1. Carefully place lumber vertically against trunk of tree, without damaging bark. Anchor first piece of lumber to tree with fabric or rubber tie around trunk temporarily. Place additional lumber pieces parallel to the first, attaching each one with smooth heavy metal wire and a metal staple on the outside of the lumber to hold securely during course of construction. Remove temporary tie. Two to three bands of wire may be necessary to hold lumber in place.

2. When complete, the lumber shall be secure around the tree with spacing between lumber pieces of 2-4 inches. Note that trees are tapered and have irregularities that will prevent a perfectly uniform appearance.

3. Fasten long pieces of orange construction flagging to top wire band to increase visibility.

3.2 TRENCHING

A. Minimize excavation in root zones of existing trees. When roots are encountered, cleanly cut the exposed root immediately with a saw or loper intended for use on trees, backfill with soil immediately and water to protect from additional damage.

3..3 EQUIPMENT & STOCKPILES

A. Do not park equipment, stockpile materials, or otherwise cause compaction to base of existing trees.

B. Do not burn tree canopies with exhaust vents on equipment.

C. Do not break branches, scrape or scar bark.

D. Do not pour liquid, chemical or any other waste material in to the soils.

PART 4: MEASUREMENT AND PAYMENT

4.1 GENERAL

A. No separate measurement and payment will be made for this item. All costs for this item shall be included in other items of the work. This shall include, but not necessarily limited to, costs associated with lumber bracing, labor, and replacement of any damaged trees.

B. Trees damaged by contractor, in the opinion of Owner or Engineer, shall be removed by Contractor, including the root ball and associated backfill and restoration, at no additional cost to the Owner.

END OF SECTION 02905

SECTION 02910
SEEDING (MPWSS, as amended)

PART 1: GENERAL

1.1 DESCRIPTION

Add the following to paragraph B.

"Hydraulic seeding shall be required for all slopes greater than 3:1.

Add the following:

"C. Seeding shall be required for all areas disturbed on site during the course of construction outside the roadway and shoulder limits. This shall include all contractor staging areas, excavation and fill areas, borrow areas, drainage ways, or other areas disturbed during the course of construction.

D. Seeding shall include redistribution of a minimum 6" thickness of topsoil and preparation for seeding, to include hauling, placement, spreading, and final grade preparation."

1.2 SUBMITTALS

Add the following:

"B. Contractor shall submit final weed–free seed mix certifications to Engineer for approval prior to seeding operations."

PART 2: PRODUCTS

2.1 SEED

Add the following:

"E. Seed mix shall be the Native Forest Mix included within Attachment A to this Section. Fertilizer shall be required as indicated within Attachment A.

NOTE: Seeding rate from Attachment A shall be doubled for hydraulic seeding as indicated in Section 02920.

Add the following Section:

"2.6 STRAW MULCH WITH TACKIFIER

A. Straw mulch shall be used on all seeded areas. Straw mulch shall consist of natural bio-degradable material, shall not contain mold, and shall be free of diseased plant residue, noxious weed seeds, harmful chemicals, and other known environmental products. Tackifier shall be included either within the straw mulch, or applied once the mulch is in place. Submit mulch and tackifier information to engineer prior to ordering materials."

PART 3: EXECUTION

3.3 SEEDBED PREPARATION AND SOWING

Delete paragraph

Add the following paragraphs:

"F. Compacted sub soils shall be ripped to a depth of six inches prior to top soil placement.

G. Topsoil on site needs to be salvaged separately from subsoil prior to beginning construction. If possible topsoil should be wind rowed rather than piled. After construction, compacted areas should be ripped and topsoil redistributed over areas to be revegetated. An ideal seed bed is topsoil lightly compacted until an average person leaves a foot print .25 to .5 inches deep in the soil."

Add the following Section:

"3.6 STRAW MULCH

A. Straw mulch shall be placed loose and open enough to allow some sunlight to penetrate and air to circulate but still cover a minimum of 70% of the soil surface. Straw mulch shall be applied at a uniform rate of 1-1/2 to 2 tons per acre for seeded areas. Mulch shall be placed within 24 hours of seeding. Tackifier shall be sprayed in conjunction with mulch or immediately thereafter. Tackifier shall be applied at a rate meeting manufacturer's recommendations. Asphalt based products shall not be applied. Mulch that is displaced shall be reapplied as soon as practical and properly anchored.

PART 4: MEASUREMENT AND PAYMENT

4.1 GENERAL

Delete and replace with the following:

"A. Seeding shall be measured and paid for per the Lump Sum as listed in the proposal. Payment shall include full compensation for all seed and fertilizer materials, seedbed preparation, topsoil installation to a minimum of 6 inches, all labor, equipment, materials and incidentals to complete seeding in place."

END OF SECTION 02910

02910 SEEDING

ATTACHMENT A

NATIVE SEED MIXES

CHS

NATIVE GRASS MIXES FOR 2009

NATIVE VALLEY MIX
15% Western Wheatgrass (S)
30% Bluebunch Wheatgrass (B)
25% Slender Wheatgrass (B)
30% Green Needlegrass (B)
25-30 lbs. Per Acre

This mix was developed for the Flathead Valley for Dryland areas.

NATIVE FOREST MIX
15% Western Wheatgrass (S)
35% Bluebunch Wheatgrass (B)
40% Mountain Brome (B)
10% Rough Fescue (B)
25-30 lbs. Per Acre

For use in forested areas of the Flathead Valley.

NATIVE RECLAMATION MIX
40% Streambank Wheatgrass (S)
35% Thickspike Wheatgrass (S)
25% Slender Wheatgrass (B)
25-30 lbs. Per Acre

A good mix for disturbed areas that won't be irrigated.

These seeding mixes are recommended by the NRCS and the Flathead Conservation District. They will establish in Flathead County on both silty and loamy sites. Extra care and patience are required as native species are slower to establish. Reseeding may be necessary.

Other native mixes are available and the NRCS and Flathead Conservation District can recommend a mix for your specific area.

We recommend 16-16-16 fertilizer at a rate of 100 lbs. per acre to help these mixes get established.

B = bunch type grass *S= sod forming grass*

SECTION 02920
HYDRAULIC SEEDING (*MPWSS, as amended*)

PART 2: PRODUCTS

Add the following to paragraph 2.1

"Hydraulic seed rate shall be doubled as indicated on Attachment A within Section 02910."

PART 3: EXECUTION

Delete paragraph 3.1 in its entirety and replace with the following:

"3.1 TOPSOIL

A. Place a minimum of 6 inches of topsoil in all areas to be hydraulically seeded as specified on plans. Topsoil shall meet requirements as described in Section 02910. Topsoil installation, to include hauling, spreading, and seed bed preparation, shall be including in the bid item for hydraulic seeding."

Delete paragraph 3.3 in its entirety and replace with the following:

"3.3 MAINTENACE RESPONSIBILITIES

A. Contractor shall inspect hydraulically seeded areas after rain storms, repair any damaged ground cover and re-mulch exposed areas until the end of the warranty period.

B. The Contractor shall maintain the hydraulically seeded area, performing any re-seeding, watering, and weed abatement required until the end of the warranty period. Enforcement of restoration, seeding, and weed control will be strictly enforced."

Add the following sections:

"3.4 TACKIFIER

All hydraulic seeding areas must have an approved steep slope tackifier included in application to prevent erosion. Tackifier shall be chosen by the Contractor and submitted and approved by the Engineer prior to hydraulic seeding.

3.5 SEEDBED PREPARATION

All seedbed preparation and seed mixtures shall be in conformance with Section 02910 Seeding.

3.6 MULCH

All hydraulic seeding areas must incorporate an approved mulch in the application to prevent erosion and protect seed growth. Mulch shall be chosen by the Contractor and submitted and approved by the Engineer prior to hydraulic seeding."

3.7 APPLICATION

Hydraulic seeding shall be applied as a liquid slurry using a hydraulic application machine (i.e. hydroseeder). Follow manufacturer's recommendations for mulch and stabilizing emulsion, to achieve complete coverage of target areas specified on project plans.

3.8 TIMING

Do not perform hydraulic seeding immediately before, during, or after a rainfall. Allow at least 24 hours before or after rainfall to apply hydraulic seeding.

PART 4: MEASUREMENT AND PAYMENT

4.1 GENERAL

Add the following paragraph:

"C. This item shall be measured and paid for by the square yard basis as indicated on the proposal. The square yard quantity was calculated off the disturbed construction limits area indicated on the plans, including the topsoil wasting areas as indicated on sheet 4.13 (these areas will require seeding). The quantity listed in the bid form shall be final. However, if an entire area as indicated on the topsoil wasting area plan sheet, 4.13, is not used, this area will be reduced from the final pay quantity. The quantity listed does not include any potential disturbed areas outside the grading limits, including but not limited to, staging areas, access corridors, construction entrances, haul roads, erosion controls, and soil stockpiles which the contractor shall be required to seed. Payment shall include full compensation for all labor, equipment, materials, and incidentals required for completing the work in conformance with the plans and specifications. Payment shall include allowance for topsoil placement and seed bed preparation."

END OF SECTION 02920

SECTION 03000
DIVISION 3 – CONCRETE

This contract will be constructed and administered under the requirements of the Montana Public Works Standard Specifications (MPWSS), Sixth Edition, April 2010, as Amended, and all supplemental documents contained herein. The Montana Public Works Standard Specifications are included in their entirety, as applicable, and as modified, amended, added, or replaced as follows:

03310 STRUCTURAL CONCRETE *(MPWSS, as amended)*

SECTION 03310
STRUCTURAL CONCRETE (*MPWSS as amended*)

PART 2: PRODUCTS

2.2 COMPOSITION OF CONCRETE

B. Performance and Design Requirements

1. Replace Table 2.1 – Minimum Cement Content Requirements with the following:

"All concrete supplied on the project shall have a minimum cement content of 564 lb/yd^3 unless otherwise approved by the Engineer, and maximum H20/cement ratio of 0.45 as the concrete will be exposed to freezing and thawing and possibly the presence of deicing chemicals."

4. Replace Table 2.2 – Total Air Content Of Concrete for Minimum Cement Content Requirements with the following:

"All concrete supplied on the project shall have a TOTAL AIR CONTENT of 6.5 percent, +/- 1 ½ percent tolerance"

Delete Section 4.c in its entirety and replace with the following:

"c. Furnish the compressive strength and the water-cement or water cementitious, material ratio of concrete for each portion of the work as specified in the Contract documents.

1) Cement content shall be 6-sack only, with no allowance for fly ash, pozzolan, or slag without written approval of the Engineer.

2) Strength requirements are based on the 28-day compressive strength determined on 6" x 12" cylindrical specimens, or other approved specimens per testing standards, made and tested under ASTM C31 and C39 respectively."

PART 3: EXECUTION

3.5 CURING CONCRETE

Add the following paragraph to E.2 Impervious Membrane Curing

"e. All concrete shall be cured in conformance with the requirements included within specification section 02529 for allowable curing products and applications."

END OF SECTION 03310